

UTILITY PATENT APPLICATION TRANSMITTAL

(Large Entity)

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Docket No.

3960.D10

Total Pages in this Submission

87

TO THE ASSISTANT COMMISSIONER FOR PATENTS

Box Patent Application
Washington, D.C. 20231

Transmitted herewith for filing under 35 U.S.C. 111(a) and 37 C.F.R. 1.53(b) is a new utility patent application for an invention entitled:

ELECTRONIC BOOK SECURE COMMUNICATION WITH HOME SUBSYSTEM

and invented by:

John S. HENDRICKS

JC675 U.S. PTO
09/722519
11/28/00

If a **CONTINUATION APPLICATION**, check appropriate box and supply the requisite information:

☒ **Continuation** ☐ **Divisional** ☐ **Continuation-in-part (CIP)** of prior application No.: 09/237,825

Which is a:

☐ **Continuation** ☒ **Divisional** ☐ **Continuation-in-part (CIP)** of prior application No.: 08/336,247

Which is a:

☐ **Continuation** ☐ **Divisional** ☒ **Continuation-in-part (CIP)** of prior application No.: 07/991,074

AND:

Enclosed are:

prior application No.: 08/160,194**Application Elements**

1. ☒ Filing fee as calculated and transmitted as described below
2. ☒ Specification having 37 pages and including the following:
 - a. ☒ Descriptive Title of the Invention
 - b. ☒ Cross References to Related Applications (if applicable)
 - c. ☐ Statement Regarding Federally-sponsored Research/Development (if applicable)
 - d. ☐ Reference to Microfiche Appendix (if applicable)
 - e. ☒ Background of the Invention
 - f. ☒ Brief Summary of the Invention
 - g. ☒ Brief Description of the Drawings (if drawings filed)
 - h. ☒ Detailed Description
 - i. ☒ Claim(s) as Classified Below
 - j. ☒ Abstract of the Disclosure

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Application Elements (Continued)

3. ☒ Drawing(s) *(when necessary as prescribed by 35 USC 113)*
- a. ☒ Formal Number of Sheets 40
- b. ☐ Informal Number of Sheets _____
4. ☒ Oath or Declaration
- a. ☐ Newly executed *(original or copy)* ☐ Unexecuted
- b. ☒ Copy from a prior application (37 CFR 1.63(d)) *(for continuation/divisional application only)*
- c. ☒ With Power of Attorney ☐ Without Power of Attorney
- d. ☐ DELETION OF INVENTOR(S)
Signed statement attached deleting inventor(s) named in the prior application,
see 37 C.F.R. 1.63(d)(2) and 1.33(b).
5. ☒ Incorporation By Reference *(usable if Box 4b is checked)*
The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
6. ☐ Computer Program in Microfiche *(Appendix)*
7. ☐ Nucleotide and/or Amino Acid Sequence Submission *(if applicable, all must be included)*
- a. ☐ Paper Copy
- b. ☐ Computer Readable Copy *(identical to computer copy)*
- c. ☐ Statement Verifying Identical Paper and Computer Readable Copy

Accompanying Application Parts

8. ☐ Assignment Papers *(cover sheet & document(s))*
9. ☐ 37 CFR 3.73(B) Statement *(when there is an assignee)*
10. ☐ English Translation Document *(if applicable)*
11. ☐ Information Disclosure Statement/PTO-1449 ☐ Copies of IDS Citations
12. ☐ Preliminary Amendment
13. ☒ Acknowledgment postcard
14. ☐ Certificate of Mailing
- ☐ First Class ☐ Express Mail *(Specify Label No.):* _____

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Accompanying Application Parts (Continued)

15. ☐ Certified Copy of Priority Document(s) *(if foreign priority is claimed)*
16. ☒ Additional Enclosures *(please identify below):*

Copy of Assignment pursuant to MPEP section 306

Request That Application Not Be Published Pursuant To 35 U.S.C. 122(b)(2)

17. ☐ Pursuant to 35 U.S.C. 122(b)(2), Applicant hereby requests that this patent application not be published pursuant to 35 U.S.C. 122(b)(1). Applicant hereby certifies that the invention disclosed in this application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication of applications 18 months after filing of the application.

Warning

An applicant who makes a request not to publish, but who subsequently files in a foreign country or under a multilateral international agreement specified in 35 U.S.C. 122(b)(2)(B)(i), must notify the Director of such filing not later than 45 days after the date of the filing of such foreign or international application. A failure of the applicant to provide such notice within the prescribed period shall result in the application being regarded as abandoned, unless it is shown to the satisfaction of the Director that the delay in submitting the notice was unintentional.

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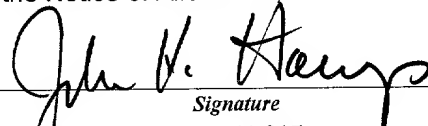
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Fee Calculation and Transmittal

CLAIMS AS FILED

For	#Filed	#Allowed	#Extra	Rate	Fee
Total Claims	26	- 20 =	6	x \$18.00	\$108.00
Indep. Claims	3	- 3 =	0	x \$80.00	\$0.00
Multiple Dependent Claims (check if applicable) <input type="checkbox"/>					\$0.00
BASIC FEE					\$710.00
OTHER FEE (specify purpose) _____					\$0.00
TOTAL FILING FEE					\$818.00

- ☒ A check in the amount of **\$818.00** to cover the filing fee is enclosed.
- ☒ The Commissioner is hereby authorized to charge and credit Deposit Account No. **04-1425** as described below. A duplicate copy of this sheet is enclosed.
- ☐ Charge the amount of _____ as filing fee.
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- ☒ Charge any additional filing fees required under 37 C.F.R. 1.16 and 1.17.
- ☐ Charge the issue fee set in 37 C.F.R. 1.18 at the mailing of the Notice of Allowance pursuant to 37 C.F.R. 1.311(b).


Signature

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Dated: November 28, 2000

CC:

ELECTRONIC BOOK SECURE COMMUNICATION WITH HOME SUBSYSTEM

RELATED APPLICATIONS

This application is a continuation of U.S. Application Serial Number 09/237,825, filed January 27, 1999, entitled ELECTRONIC BOOK SELECTION AND DELIVERY SYSTEM, which is a divisional of U.S. Application Serial Number 08/336,247, filed November 7, 1994, entitled ELECTRONIC BOOK SELECTION AND DELIVERY SYSTEM, which is a continuation-in-part of U.S. Application Serial Number 07/991,074, filed December 9, 1992, entitled REMOTE CONTROL FOR MENU DRIVEN SUBSCRIBER ACCESS TO TELEVISION PROGRAMMING and U.S. Application Serial Number 08/160,194, entitled ADVANCED SET-TOP TERMINAL FOR CABLE TELEVISION DELIVERY SYSTEMS, filed December 9, 1993.

BACKGROUND OF THE INVENTION

Sparked by the concept of an information superhighway, a revolution will take place in the distribution of books. Not since the introduction of Gutenberg's movable typeset printing has the world stood on the brink of such a revolution in the distribution of text material. The definition of the word "book" will change drastically in the near future. Due to reasons such as security, convenience, cost, and other technical problems, book and magazine publishers are currently only able to distribute their products in paper form. This invention solves the problems encountered by publishers.

SUMMARY OF INVENTION

The electronic book selection and delivery system is a new way to distribute books to bookstores, libraries, and consumers. The technological breakthroughs of this invention provide a secure electronic system for both delivering selected books and receiving payments. The system has an unusual combination of features that provides the consumer with a daily use household appliance that has a high tech aura while being very practical, portable, and easy to use.

1 The clear advantage of the system is that it eliminates the distribution of any physical
2 object such as a paper book or computer memory device from any book distribution system.
3 The purchase of a book becomes a pay-per-read™ event avoiding the overhead, "middle-
4 men," printing costs, and time delay associated with the current book distribution system.
5 Published material and text such as the President's speech, a new law, a court decision on
6 abortion, or O.J. Simpson's testimony can be made immediately available to the consumer at
7 a nominal fee.

8 The system is a novel combination of new technology involving the television, cable,
9 telephone, and computer industries. It utilizes high bandwidth data transmissions, strong
10 security measures, sophisticated digital switching, high resolution visual displays and user
11 friendly interface software.

12 The primary components of the text delivery system are the subsystem for placing the
13 text onto a video signal and the subsystem for receiving and selecting text that was placed on
14 the video signal. The preferred embodiment of the system includes additional components and
15 optional features that enhance the system. The system may be configured for use by
16 bookstores, libraries, and consumers. The system for consumer use is made up of four
17 subsystems, namely: (1) an Operations Center, (2) a video distribution system, (3) a home
18 subsystem including reception, selection, viewing, transacting and transmission capabilities, and
19 (4) a billing and collection system.

20 The Operations Center performs several primary functions: manipulating text data
21 (including receiving, formatting and storing of text data), security encoding text, cataloging
22 books, providing a messaging center capability, and performing uplink functions. The system
23 delivers the text from the Operations Center to consumer homes by inserting data within analog
24 video signals. The insertion of text is generally performed with a text generator and an encoder
25 at an uplink site that is within or near the Operations Center. The system can be several lines
26 of the Vertical Blanking Interval (VBI), all the lines of the analog video signal, or a digital video
27 signal to transmit text data. Using the VBI delivery method, the top ten or twenty book titles

1 may be transmitted with video during normal programming utilizing existing cable or broadcast
2 transmission capability without disruption to the subscriber's video reception. Using the entire
3 video signal, thousands of books may be transmitted within just one hour of air time. Nearly
4 any analog or digital video distribution system may be used to deliver the video signal with
5 included text.

6 The home subsystem performs five primary functions: connecting to the video
7 distribution system, selecting text, storing text, displaying text, and transacting through a phone
8 or cable communicating mechanism. The components of the home subsystem may be
9 configured in a variety of hardware configurations. Each function may be performed by a
10 separate component, the components may be integrated, or the capability of existing cable set
11 top converter boxes and televisions may be utilized. Preferably, a connector, library unit and
12 viewer unit are used. The connector portion of the home subsystem receives the analog video
13 signal and strips or extracts the text from the video. The home library stores the text signal,
14 provides a user friendly software interface to the system and processes the transactions at the
15 consumer home. The viewer provides a screen for viewing text or menus.

16 The viewing device is preferably a portable book shaped viewer which stores one or
17 more books for viewing and provides a screen for interacting with the home library unit. A high
18 resolution LCD display is used to both read the books and to interact with the home library
19 software. An optional phone connector or return-path cable connection initiates the telephone
20 calls and, with the aid of the library, transmits the necessary data to complete the ordering and
21 billing portion of the consumer transaction. The billing and collection system performs
22 transaction management, authorizations, collections and publisher payments automatically
23 utilizing the telephone system.

24 **DESCRIPTION OF THE DRAWINGS**

25 Figure 1 is a block diagram of the primary components of the electronic book selection
26 and delivery system.

1 Figure 2 is a schematic showing an overview of the electronic book selection and
2 delivery system.

3 Figure 3 is a schematic of the delivery plan for the electronic book selection and
4 delivery system.

5 Figure 4 is a block diagram of the operations center.

6 Figure 5a is a flow diagram of the processing at the operations center and uplink.

7 Figure 5b is a block diagram of the hardware configuration for an uplink site.

8 Figure 6a is a block diagram of the hardware configuration for a four component home
9 subsystem.

10 Figure 6b is a schematic of a two unit home subsystem.

11 Figure 7 is a flow diagram of the processes performed by the video connector.

12 Figure 8 is a block diagram for an example of a library unit.

13 Figure 9 is a flow diagram of some of the processes performed by the library on the
14 received data stream.

15 Figure 10 is a flow diagram of the processes performed by the library unit on
16 information requests from the viewer.

17 Figure 11 is a block diagram showing the components for an example of a viewer.

18 Figure 12 is a flow diagram of some of the processes performed by the viewer on an
19 information request from a subscriber.

20 Figure 13 is a chart depicting the menu structure and sequencing of menus in the menu
21 system.

22 Figure 14a is a schematic of an introductory menu.

23 Figure 14b is a schematic showing an example of a main menu.

24 Figure 14c through Figure 14q are schematics showing examples of submenus.

25 Figure 14r is a schematic showing another example of a main menu.

26 Figure 14s and Figure 14t are schematics showing examples of screens for a book.

1 Figure 15 is a schematic diagram of an electronic book system for a bookstore or
2 public library.

3 Figure 16a and Figure 16b are schematics of hardware modifications or upgrades to
4 a set top converter.

5 Figure 17 is a schematic showing a set top terminal that includes a data receiver and
6 data transmitter.

7 Figure 18a is a schematic of a book-on-demand system.

8 Figure 18b is a schematic of an operations center supporting a book-on-demand
9 system.

10 **DETAILED DESCRIPTION**

11 The primary components of the electronic book selection and delivery system 200 are
12 an encoder 204, a video distribution system 208, a connector 212, and a text selector 216 as
13 shown in figure 1. The encoder 204 places textual data on a video signal to form a composite
14 signal. A variety of equipment and methods may be used to encode text data onto a video
15 signal. The video distribution system 208 distributes the video signal from the single point of
16 the encoder 204 to multiple locations which have connectors 212. The connector 212 receives
17 the digital or analog video signal from the video distribution system 208 and separates, strips
18 or extracts the text data from the composite video signal. If necessary, the extracted text data
19 is converted into a digital bit stream. Text selector 216 works in connection with the connector
20 212 to select text.

21 Using a connector 212 and text selector 216 combination, various methods of selecting
22 and retrieving desired text from a composite or video signal are possible. Text may be
23 preselected, selected as received or selected after being received and stored. The preferred
24 method is for the connector 212 to strip all the text from the video signal and have the text
25 selector 216 screen all the text as received from the connector 212. The text selector 216 only
26 stores text in long term or permanent memory if the text passes a screening process described
27 below.

1 An overview of a preferred embodiment is shown in figure 2. The system 200 includes:
2 an operations center 250 including an uplink site 254, a video distribution system 208, a home
3 subsystem 258 including a video connector 212, a library 262, a viewer 266, and a phone
4 connector 270, and telephone system 274 and a billing and collection subsystem 278. The
5 operations center receives textual material from outside sources 282 such as publishers,
6 newspapers, and on-line services. The operations center receives this textual material in
7 various digital formats and converts them to a standard compressed format for storage. In so
8 doing, the operations center creates a pool of textual material that is available to be delivered
9 to the home system. Normally, the text material is grouped by books or titles for easy access.
10 The operations center includes an uplink site for placing the text onto a video signal and sending
11 the composite video signal into a video distribution system. The uplink site would generally
12 include an encoder (not shown in Figure 2) to encode the text onto a video signal.

13 Many analog and digital video distribution systems 208 can be used with this text
14 delivery system 200, such as, cable television distribution systems, broadcast television
15 distribution systems, video distributed over telephone systems, direct satellite broadcast
16 distribution systems, and other wire and wireless distribution systems. Nearly any distribution
17 system which can deliver a video signal will work with the text delivery system. It is also
18 possible to distribute the text without using a video signal as described below.

19 The home subsystem performs five primary functions, (1) connecting with a video
20 distribution system, (2) selecting data, (3) storing data, (4) displaying data, and (5) handling
21 transactions. An important optional function of the home sub-system is communicating using
22 a telephone communication system. The home subsystem is made up of primarily four parts:
23 a video connector 212 or similar type of connector for connecting with a video distribution
24 system, a library unit 262 for storing and processing, a viewer unit 266 for viewing menus and
25 text and a telephone connector 270 for connecting with a telephone communications system
26 274.

1 The billing and collection subsystem 278 may be co-located with the operations center
2 250 or located remote from the operations center. The billing and collection subsystem 278
3 is in communication with the home subsystem via telephone-type communication systems. Any
4 of a number of telephone type communication systems, such as, a cellular system, will operate
5 with the billing and collection system. The billing and collection system records the books or
6 portions of text that are selected or ordered by the subscriber. The collection system will
7 charge a subscriber's credit account or bill the subscriber. In addition, the billing and collection
8 system will monitor that amount due to publishers or other outside sources 282 who have
9 provided textual data or other services such as air time to enable the text delivery system 200
10 to operate.

11 Figure 3 is an expanded overview of a preferred delivery plan for the electronic book
12 selection and delivery system. It is a comprehensive delivery plan to support various types of
13 users and various billing systems. Figure 3 shows that publishers 282 will provide text transfer
14 302 to the operations center 250' and receive payments 306 from the billing and collection
15 system 278'. A separate channel uplink site 254' is shown in this configuration receiving data
16 310 from the operations center 250'. The operations center 250' has three separate sections
17 (318, 322, 326) one for text receiving, formatting and re-entry 318, a second for security
18 encoding 322 and a third section for catalog and messaging center functions 326.

19 The collection and billing system 278' shown has two sections (330, 334) one for
20 transaction management, authorizations and publisher payments 330, and the other for
21 customer service 334. The customer service section 334 provides for data entry and access
22 to customer account information. Transaction accounting information 338 is supplied to credit
23 card companies 342 by the transaction management section 330 of the billing and collection
24 system 278'. The credit card companies 342 provide billing 346 to customers either
25 electronically or by mail.

26 Three methods for communicating between the subscriber base 348 and the billing and
27 collection system 278' are shown: by telephone switching 350 alone, cellular switching 354

1 and telephone switching 250 combined, and by use of the cable system 358 and the telephone
2 switching 350. The system shown supports both one-way 362 and two-way cable
3 communication 366 with subscribers. Libraries and schools 370 as well as bookstores 374
4 may use the delivery system.

5 Libraries and schools 370 would have a modified system to allow the viewer to be
6 checked-out or borrowed while bookstores 374 would rent or sell the viewer and sell
7 electronic book data. The bookstores 374 as well as the libraries and schools 370 may be
8 serviced by cable 378. Optional direct broadcast systems (DBS) 382 can also be used with
9 the system 200.

10 I. The Operations Center

11 Figure 4 is a schematic of an operations center 250 which includes an uplink 254. The
12 Operations Center 250 gathers text or books by receiving, formatting, storing, and encoding.
13 A data stream 302 containing text is received at the operations center by a data receiver 402.
14 The data receiver 402 is under the control of a processor 404. After reception, the data
15 stream is formatted using digital logic for formatting 406 which is also under the control of the
16 processor 404. If any additional text is being generated at the operation center locally for
17 insertion into the distributed signal, the text generation is handled through text generator
18 hardware 410 which may include a data receiver and a keyboard (not shown). Following
19 processing by the text generator, the additional text can be added to the text received the
20 combining hardware 414 that includes digital logic circuitry (not shown).

21 The processing at the operations center is controlled by a processor 404 which uses
22 an instruction memory 416. The processor and instruction memory may be supplied by a
23 personal computer or mini-computer. To perform the catalog and messaging functions, the
24 operations center uses a catalog and message memory 420 and the text generator 410 if
25 necessary.

26 The data stream of text, catalog and messages is preferably encoded by a security
27 ending prior to being sent to the uplink module 424. Various encoding techniques may be

1 used such as the commercial derivative of NSA's encryption algorithm, Data Encryption
2 System (DES), and General Instrument's DigiCipher II may be used by the security encoding
3 module 424. Following encoding, the encoded text may be stored in text memory 428 prior
4 to being sent the uplink 254. It is preferred that a first-in-first-out text memory arrangement
5 is used under the control of the processor 404. Various types of memory may be used for the
6 text memory 428 including RAM. The operations center may use file server technology for the
7 text memory 428 to catalog and spool books for transmission as is described below.

8 To transmit textual data, the delivery system uses high bandwidth transmission
9 techniques such as those defined by the North American Broadcast Teletext Standard
10 (NABTS) and the World System Teletext (WST) standard. Using the WST format (where
11 each line of the Vertical Blanking Interval contains 266 data bits), a four hundred page book,
12 for example, may be transmitted during programming using four lines of the Vertical Blanking
13 Interval at a rate of approximately one book every 1.6 minutes (63,840 bits per second).
14 Alternatively, books may be transmitted over a dedicated channel, which interrupts
15 programming so that 246 lines of video can be used to transmit approximately 2,250 books
16 every hour (3.9 Mbits per second). A teletext type format is the simplest but possibly the
17 slowest text format to use with the system. In either event, an encoder is utilized at an uplink
18 site to insert textual data into the analog video signal. In many other respects, the delivery of
19 the textual information is completed using existing cable television plants and equipment.

20 Figure 5a is a flowchart of the steps involved in processing text from the publisher or
21 provider 282 that occurs at the operations center 250. As shown in block 500, the publisher
22 282 processes data files of text for books, compresses, encrypts and sends the data files to the
23 operations center or uplink. Text files for books are preferably sent one book at a time. As
24 shown in block 504, the uplink 254 or operations center 250 receives and processes the data
25 stream from the publisher 282. Generally, part of this processing includes encryption and error
26 correction.

1 As shown in block 508, files are broken into smaller packets of information. Header
2 information is added to the packets. The bit stream is converted from a serial digital bit stream
3 to an analog bit stream that is compatible with an NTSC video signal. Block 512 shows the
4 switching of analog data into the video lines of a video signal. The analog data is either placed
5 in the VBI or the active video lines.

6 Figure 5b is an example of a hardware configuration to perform some of the functions
7 for blocks 508 and 512. A video feed 516 is received and processed through a sync stripper
8 520. The sync signal 532 stripped is used by the digital logic control 524. The digital logic
9 control 524 receives the sync signal 532 and a serial digital bit stream 528 for processing. The
10 digital logic control 524 passes the serial digital bit stream to the Digital to Analog converter
11 536 and outputs a control signal 540 for the video switch 544. The video switch 544 integrates
12 the video feed 516 and analog data stream 548 into a video feed with analog data signal
13 inserted 552.

14 As an alternative to cable or television delivery methods, the telephone system may be
15 used to transmit books to the subscribers. An average book would take about 7 minutes to
16 transmit over the public telephone system. Using the telephone system, it is not necessary to
17 combine video and text into a composite signal. In most other respects, the operation center
18 would remain similar whether text delivery was by telephone or cable. It is preferred that file
19 server technology (such as that described in U.S. Patent No. 5,262,875, entitled
20 AUDIO/VIDEO FILE SERVER INCLUDING DECOMPRESSION/PLAYBACK
21 MEANS, issued to Mincer, et al., and, U.S. Patent No. 5,218,695, entitled FILE SERVER
22 SYSTEM HAVING HIGH-SPEED WRITE EXECUTION, issued to Noveck, et al.,
23 incorporated herein by reference) be used at the operation center with a telephone system text
24 delivery method.

25 II. The Home Subsystem

26 The hardware configuration for a four component home subsystem 258 is shown in
27 figure 6a. Figure 6b shows a hardware configuration for a two component home subsystem.

1 The home subsystem 258 performs several functions, such as receiving data and video
2 transmissions, stripping the data from the video signal, screening and storing the data, providing
3 user friendly interface software, displaying menus and text, processing transactions, initiating
4 telephone calls and transmitting billing data. Various hardware configurations may be utilized
5 to achieve the desired functions of the home subsystem. For example, as shown in figure 6b,
6 the home subsystem can be configured to utilize the reception and channel tuning capability of
7 the current installed subscriber base of cable converter boxes and televisions 601. The home
8 subsystem can also be designed as an advanced set top terminal converter box with menu
9 generation capability, electronic memory and a telephone modem as described in section V
10 below.

11 The electronic components which make up the home subsystem can be arranged in a
12 variety of ways. In the four unit subsystem of figure 6a the viewer 266 and library 262 are
13 wired together while the remaining components communicate through RF transceivers 604.
14 In the simplest version of the home subsystem there are only two units, a library 262 and a
15 viewer 266. Figure 6b shows a two unit home subsystem with certain optional features. The
16 viewer 266 is generally equipped with a high resolution viewing area 602, digital logic (including
17 a key 605, security 606, and a microprocessor 621), video graphics control and memory 607,
18 power supply circuitry 602 (not shown), an optional battery 603 and an optional RF
19 transceiver 604. In a two unit arrangement, the library 262 contains the connector function to
20 the video distribution system, connector function to a public telephone communications system,
21 and memory 600 (which may be removable and portable 600'). More specifically, the library
22 would include data stripping functions 617, digital logic 609, memory storage 600, power
23 circuitry 610, optional telephone connections 611 (including cellular or PCN 611'), optional
24 battery (not shown), optional tuner module 613 and an optional RF transceiver 604. The video
25 connector 212 and the public telephone system connection 270, as well as the removable
26 portable memory unit 600 of the library may be broken out into separate components. (Figure
27 6b shows a removable portable hard disk memory 600' with removable cartridges 614.)

1 Therefore, the home subsystem may have as many as five separate components which
2 communicate with each other. The two, three, four or five separate components which make
3 up the home subsystem can communicate with each other in a variety of ways, including
4 hardwired connection 615, RF transceiver 604 and other wireless methods.

5 RF communications are preferred in the home because it allows the separate
6 components to be located throughout the home without restriction.

7 The data communicated between the units is preferably secure data. In addition, the
8 library 262 may provide power to the viewer 266 through the hard wire communication link
9 615.

10 To receive and strip the data from the video signal at the consumer's home, either a
11 cable interface device or cable connector is used. The cable connector device includes a tuner
12 613, while the cable interface device makes use of existing tuning equipment in the home. In
13 either configuration, data is stripped from the video signal and stored at the subscriber's location
14 in the library 262. The phone connector 270, and modem 611 initiate telephone calls and
15 transmit ordering and billing information to the Operations Center or billing and collection
16 system. The home library 262 is the intelligent component of the home subsystem,
17 incorporating the hardware and software necessary to store the text data, generate menus and
18 effect the purchase transactions. In addition to an RF transceiver 604, the home library 262
19 also includes the necessary jacks and connections to allow the system to be connected to the
20 viewer 266. As shown in figure 6b, the library communicates the text data to the viewer in a
21 secure format which requires a key 605 for decryption. The text is generally only decrypted
22 page by page just before viewing.

23 a. The Video Connector

24 Figure 7 shows the flow of the processes performed by the video connector 212. The
25 video connector receives the video signal 608, tunes to the channel containing the text data
26 612, strips the text data from the video signal 616, and communicates the text data stream to
27 logic components in the library 620.

1 The connection to the video distribution system is preferably a cable connector to a
2 cable television delivery system, as shown in Figure 6b. The cable connector includes a data
3 stripper circuit 617, which accepts video input from either a set top converter, TV or VCR
4 601, or an optional tuner block 613 that receives the CATV signal through the cable connector
5 212'. The data stripper circuit 617 strips data out of the video, and outputs a digital bit stream
6 to the digital logic portion 609 of the library unit 262. The data is embedded in the video signal
7 either in the vertical blanking interval or the active video portion in an encrypted and
8 compressed format. The data stripper circuit 617 can be placed inside the set top converter
9 box 601, TV, or in the library unit. The data stripper circuit 617 outputs the digital bit stream
10 to be used by the library digital logic 609.

11 The video connector 212 may also contain a channel tuner module 613 that can tune
12 to the video channel and provide access to the video that contains the data to be stripped.
13 Using the optional tuner module 613, a set top converter, VCR, or TV tuner is not needed in
14 the home subsystem. The optional tuner module 613 would instead receive the CATV signal
15 directly through the cable connector 212'.

16 b. Library

17 An embodiment of the library 212 for a two unit home subsystem is shown in both
18 Figure 6b and Figure 8. The embodiment shown includes the following optional parts the video
19 connector 212, phone connector 270, RF transceiver 604, and battery pack 624 in addition
20 to a removal portable memory 600', microprocessor 628, instruction memory unit 632, digital
21 logic 636, and power unit 640.

22 The library 262 contains a digital logic section 609 (not shown in Figure 8) which
23 includes the microprocessor 628, the digital logic 636 and the instruction memory unit 632.
24 The microprocessor 628 is preferably a secure microprocessor such as the Mot SC21 device
25 sold by Motorola. The digital logic section 609 will receive the serial digital bit stream from the
26 data stripper circuit 617 and process the data. Error correction will also be performed by the
27 digital logic section 609 and the data will be checked for proper address. If the address of the

1 data is correct and the library 262 is authorized to receive the data, the data will be transferred
2 to the memory storage unit 600, 600'. Authorization to receive the data is provided by the
3 cable headend or another distribution point. An authorization code may be sent in the serial
4 digital bit stream. The digital logic section 609 will send appropriate text and graphical data
5 to the memory storage unit 600, 600'. It transfers this data in a compressed and encrypted
6 format and the data remains stored in a compressed and encrypted format.

7 i. Memory Storage Unit

8 The memory storage unit of the library is preferably a removable portable memory unit
9 600 (as shown in figures 6a, 6b and 8). A variety of options are available for memory storage:
10 a hard disk drive, such as an 80 megabyte, a 200 megabyte, a hard disk with removable
11 platters, and CD ROM. Referring to figure 6b, a hard disk drive unit 600' which contains
12 removable platters may also be used. This would provide virtually unlimited library storage
13 capacity. Data will be stored in the memory storage unit in a compressed and encrypted
14 format. As is also shown in figure 6b, the data will also contain a key or unique ID number that
15 matches the ID or key of the viewer 266. This matching of a unique key or ID number
16 prevents unauthorized transfer of text data from the memory storage unit to an unauthorized
17 viewer. Small memory devices such as smart cards, electronic memory cards or PCM CIA
18 cards (personal computer memory card industry association) may also be used to store the
19 data.

20 ii. Power Circuitry

21 As shown in figures 6b and 8, the library 262 will accept power from either AC wall
22 power or optional battery power. It is preferred that the power circuitry provide all the voltage
23 necessary from either the battery 624 or AC unit for the various circuitry in the library.
24 Preferably the power circuitry will also provide power to the viewer through a single data cable
25 when connected to the viewer. The power circuitry will recharge the battery using AC power
26 when in operation. With the optional battery unit 624 installed, the library 262 becomes a
27 portable unit and can still provide power to the viewer 266. In order to extend battery life,

1 power conservation measures may be utilized, such as shutting down the memory system when
2 not in use. When the viewer unit 266 is being utilized and the library circuitry is not being
3 utilized, virtually all power may be shut down to the library 262.

4 iii. Connection to the Public Telephone System

5 The connection to the telephone system is preferably provided by a modem 611.
6 Various available modems may be used to perform this function. As shown in figure 6b,
7 cellular phone or PCN phone connections 611' may also be provided. When the home
8 subsystem is first initialized, the modem will be used to transfer the name and credit card
9 information of the consumer to the billing and collection subsystem. The telephone connection
10 270 may be utilized each time a book is purchased by a consumer to complete and record the
11 transaction. The telephone connection 270 may also be used as a means for receiving the text
12 data from the operations center, by-passing the video distribution system. The phone
13 connection 270 may be a separate unit as shown in Figure 6b.

14 iv. Library Processing

15 Figure 9 shows an example of some basic processing performed by the library 262 on
16 the data stream received from the video connector 212 or stripper circuit 617. First the data
17 stream is checked for error correction by block 650. If an error is detected, block 654 de-
18 interleaves the data followed by block 658 running a FEC (Forward Error Correcting)
19 algorithm. The combination of block 650, 654 and 658 perform the error correction needed
20 on the data stream. If no error correction is necessary the data proceeds to block 662 where
21 packets are individually checked for packet address.

22 If the address is a unique address, block 666 checks whether the address of the packet
23 matches the library box ID number. The library box ID number is a unique number associated
24 with that library 262 which is used to ensure security of the data. Block 670 determines
25 whether an electronic file has already been opened into which the data packet can be saved.
26 If no data file has been opened then block 674 opens a new data file for that packet. If an
27 electronic file has been opened, then the packet is saved in that electronic file on disk, block

678. Next, the process checks to see if this is the last packet for a particular book for a particular textual data block being received 682. If it is the last packet of information, then the electronic file is closed and the directory of available electronic files is updated 686. Following either block 682 or 686, the process returns to receive another data packet from the data stream received from the data stripper block.

With the packet address is checked and the address is determined to be a broadcast address, the process determines the type of message that is being sent 690. The message is then stored in appropriate electronic message file 694 and the process is returned to block 650 to receive another data packet and perform another error check.

Using the process of Figure 9, the library is able to receive, store and update directories related to the textual data and graphical data that can be used to depict pictures in a given book. Variations of the processes are possible depending on the format of the data and operating system of the library 262.

Figure 10 shows an example of the processing of information requests from the viewer 266 at the library 262. Information requests from the viewer 266 are received either through the cable connecting the viewer 266 to the library 262 or through wireless transmissions such as RF. It is possible in some embodiments for subscribers' requests to come from a set top converter box 602.

Information requests received from the viewer 266 generally fall into three categories: (1) directory data of books stored in the library 262, (2) index of all available books on the system, and (3) requests for a specific book (Block 700). Process block 704 answers a request from the viewer 266 for a directory of data showing the books stored at the viewer 266. The directory of data is sent to the viewer 266 so that it may be displayed to the subscriber. Process block 708 handles requests from the viewer 266 for an index of all available books on the system. The library 262 will obtain an index of all the available books on the system and transmit that index, process 712, with menu information to the viewer box. Process block 716 replies to a request from the viewer 266 for a specific book. The library

262 opens an electronic file for the specific book requested by the viewer 266 and transmits the record or transmits the information on a packet-by-packet basis to the viewer, 720. This process of transmitting the specific book, record, or packets to the viewer continues until the last record or packet has been sent, 724.

In addition to the processes shown on Figure 10 in handling a request for a specific book, the library 262 also orders and receives specific books from the operations center 250 using the process as described in 716. Following a request for a specific book which is not stored at the library 262, the library 262 will proceed to determine the next available time the book will be on the video distribution system 208 and ensure reception and storage of that book (process not shown). In performing this process the library 262 will transmit to the viewer information on when it will obtain the text data for the book so that the subscriber may view the book. In addition to timing information, price and other ordering information may also be passed by the library unit 262 to the subscriber.

c. The Viewer

Figure 11 is a block diagram of a viewer 266 showing its internal components. The viewer 266 of Figure 11 is similar to the viewer 266 depicted in Figure 6b. The viewer 266 is designed to physically resemble a bound book. The viewer 266 is made up of five primary components and four optional components: (1) LCD display 602, (2) digital circuitry (not shown), (3) video graphics controller 607', (4) controls 740, (5) book memory 728, (6) optional power supply circuitry 736, (7) optional battery 603', (8) optional RF transceiver 604, and (9) optional cellular or mobile communicator (not shown).

(1) A high resolution LCD screen, preferably of VGA quality, is used by the viewer 266 to display text and graphic images. The screen is preferably the size of one page of a book.

(2) Digital circuitry that includes a secure microprocessor 621, instruction memory 732, and digital logic. Data is transferred to the viewer 266 in compressed and encrypted format. The secure microprocessor 621 compares the ID number of the viewer 266 with the

1 incoming data stream and only stores the text data if the ID number of the viewer 266 matches
2 that within the incoming data stream. It is preferred that the viewer 266 not output text data
3 or other data and that the data is decompressed and decrypted only at the moment of viewing
4 and only for the current page being viewed. These measures are preferred because they
5 provide additional security against unauthorized access to data.

6 (3) A video graphics controller 607' that is capable of assisting and displaying
7 VGA quality text and graphic images is included in the viewer 266. The graphics controller
8 607' is controlled by the digital circuitry described above. Text may be displayed in multiple
9 font sizes.

10 (4) The viewer 266 of Figure 11 has touch panel controls 740. The controls 740
11 allow the consumer to select stored books and books from catalogues, move a cursor, and turn
12 pages in a book. Typically, the preferred controls include forward and reverse page buttons
13 741, a ball 743 for cursor movement, a selection button 745, a current book button 747 and
14 a bookmark button 749 (see Figure 14a).

15 (5) Book memory 728 for at least one book or more of text is included in the viewer
16 266. The memory 728 stores text and any graphics which represent pictures in a book. The
17 memory 728 can also store menu graphics data. Two different memory 728 devices may be
18 used in the viewer 266, one for the instructions for the microprocessor 621 in the digital
19 circuitry and a second type of memory may be used for the book memory 728. Various
20 memory devices available on the market may be used such as, ROM, RAM or a small hard
21 disk. Since a book requires approximately 0.6 megabytes of storage, a small hard disk
22 providing approximately 60 MBytes of storage provides memory to store approximately 100
23 books. Text for books may be stored in various font sizes so that larger or smaller fonts may
24 be recalled from memory 728 as desired.

25 (6) Power supply circuitry 736 in the view will accept power from either an AC
26 power source or from an optional battery 603', or the library 262. The power supply circuitry
27 provides the necessary voltages to accommodate the various systems within the viewer 266.

1 (7) An optional battery 603' is provided in the preferred embodiment. The battery
2 603' is automatically recharged when AC power is available.

3 (8) An optional RF transceiver 604 which provided two-way data link between
4 the viewer 266 and other components of the home subsystem can also be included in the
5 viewer 266.

6 (9) Also, the viewer 266 may include a cellular transceiver (not shown) for mobile
7 communications.

8 The viewer 266 of Figure 11 has parts available for providing a library connection 744,
9 electronic card memory 748, CD ROM units 752, and a portable memory unit 756 (such as
10 that shown in Figure 6b 600'). Various electronic memory cards such as PCM CIA can be
11 used with this viewer 266.

12 Security, low power consumption and excellent display technology are desired features
13 of the viewer 266 design. The viewer 266 should be lightweight and portable. The viewer 266
14 contains a software operating system that allows books to be stored, read and erased and
15 includes the capability to order books and retain them in memory for a predefined period of
16 time determined by the system operator. The software can be configured to allow the book
17 to be read during a period of time (i.e., two weeks) and then automatically erased, read once
18 and erased, or held in memory permanently. Each viewer 266 has a unique key 605. All of
19 the data storage is encrypted with the key 605 for an individual viewer 266 to prevent more
20 than one viewer device 266 accessing the text file or book file.

21 Figure 12 is a flow diagram of some of the processes executed by the viewer 266.
22 Generally, the viewer 266 receives inputs from the subscriber through touch panel controls 740.
23 The subscriber's information requests are then processed 800 by the viewer 266.

24 If the subscriber requests a menu of available books, process block 804 will select a
25 book menu. Process block 808 will open the electronic files which list the books that are
26 available (related to the category of topic of the menu) and display the menu with the names
27 of the available books.

1 If the subscriber selects a particular book to read, then process block 812 will process
2 the selection and determine the electronic file that contains the specific book. Process block
3 816 will open the file for that specific book and normally access the first page. (If a pointer has
4 already been set in that books electronic file, the process may default to that pointer.) Process
5 block 820 will then determine which page needs to be displayed. Process block 820 will
6 determine whether a next page, previous page or a bookmarked page needs to be displayed.
7 If the pointer for the electronic file is not in the correct location then process block 828 will
8 move the pointer and obtain the previous page of data from the stored file. Otherwise, process
9 block 824 will normally obtain the next page of text from the stored electronic file. Process
10 block 832 will decrypt and decompress the text data and send the data to the video display.
11 The video display will generally have a video display memory associated with it and process
12 block 832 will send the data directly to that video display memory. The circuitry for the display
13 then completes the process of displaying the page of text.

14 If the subscriber, through the controls 740, requests (from process block 800) that the
15 power be turned off, then the process, 836, of turning the power off will be initiated. Process
16 block 840 saves the pointer in memory to the page number in the book that the viewer 266 is
17 currently reading. Process block 844 closes all the electronic files and signals the power
18 circuitry to shut down the power to the various circuits in the viewer 266. With these examples
19 of basic processes the viewer 266 is able to display book selections and display text from those
20 books.

21 d. Menu System

22 It is preferred that the electronic book system have a menu system for selecting features
23 and books from the electronic book system. The operating software and memory required for
24 the menu system is preferably located at the viewer 266. However, it can also be located at
25 the library or the library and the viewer 266 can share the software and memory needed to
26 operate the menu system. Since the menus are usually displayed on the viewer 266 and it is

1 preferred that the viewer 266 be capable of operating in the absence of the library, the basic
2 software and memory to create the menus is more conveniently located at the viewer 266.

3 The preferred menu system is a system which allows sequencing between menus and
4 provides menu graphics for graphical displays such as on the viewer 266. In a system which
5 uses a set top converter these menus may also be displayed on a television screen. In the
6 simplest embodiment, the menus provide just basic text information for the subscriber to choose
7 from. In more sophisticated embodiments, the menus provide visual displays and icons to assist
8 the subscriber.

9 Figure 13 depicts a menu system with sequencing. The primary menus in the system
10 are an introductory menu 850, a main menu 854 and various submenus 858. In the
11 embodiment shown, there are three levels of submenus. In certain instances one or two
12 submenus is sufficient to easily direct the subscriber to the selection or information requested.
13 However, there are features in which three or more submenus makes the user interface more
14 friendly for the subscriber. Each level of submenus may consist of various menus. The
15 particular menu displayed depends on the selection by the subscriber on the previous shown
16 menu. An example of this tree sequence of menus are the help submenus 887, 888.
17 Depending upon the specific help requested, a different menu is displayed.

18 An example of an introductory menu 850 is shown on Figure 14a. Generally the
19 introductory menu 850 introduces the viewer 266 to the system and provides initial guidance
20 and instruction. The introductory menu 850 is followed by a main menu 854, an example of
21 which is shown in Figure 14b. The main menu provides the viewer 266 with the basic selection
22 or features available in the system. For example, Figure 14b shows that the viewer 266 is able
23 to choose by a point and click method, six available options; (1) free previews, (2) books you
24 can order, (3) books in your library, (4) your current book, (5) help, and (6) other system
25 features. Following a selection on the main menu, a submenu is shown.

26 Figure 13 shows ten available primary or first level submenus. They are (1) account
27 set up 862, (2) free previews 866, (3) books in your library 872, (4) books you can order 878,

1 (5) your current book 884, (6) help 887, (7) available features 890, (8) messages 893, (9)
2 account information 896 (10) outgoing message submenu 898. Figure 14c is an example of
3 a first level submenu for books in your library 872. This "Book In Your Library" submenu
4 shows six available books by title and author and provides the subscriber with the ability to
5 check a different shelf of books or return to the main menu. Figures 14d and 14e show other
6 submenus for books that may be ordered using the "Books You Can Order" submenu.

7 The "Account Set Up Menu" 862 and further submenu us related to account set up
8 (which provide instructions and account input 864) are shown in Figures 14f through Figure
9 14m. These submenus allow initialization of an account at the operations center and orders to
10 be charged to credit cards. The submenus include the ability to enter data related to your credit
11 cards.

12 Free previews for books 866 are also provided by submenus (868, 870). Examples
13 of the free preview menus are shown in Figure 14n, Figure 14o, and Figure 14p.

14 Referring to Figure 13, submenus are shown on the "Books In Your Library" submenu
15 872 and are preferably broken into shelf numbers with submenus for each shelf 874, 876. The
16 submenus on the "Books You Can Order" submenu 878 is similarly broken out into submenus
17 by shelves 880, 882. These shelves may each be a category or genre of books. Books may
18 be grouped into categories such as best sellers, novels, fiction, romance, etc. See Figure 14d.

19 Referring to Figure 13, the submenu for "Your Current Book" allows a subscriber to
20 select a current book 884 and then determine what page to view. This selection is confirmed
21 with submenu 885. The help submenu provides the subscriber with additional help screens
22 888. The submenus for available features 890 are preferably broken out into a separate
23 submenu for each feature 891, 892.

24 Referring to Figure 13, messages can also be sent with the electronic book selection
25 and delivery system. A level one message screen provides the subscriber with the ability to
26 select from the various pending messages he has 893. Each message is then shown on a
27 separate submenu screen 894, 895. An example of such a submenu is shown in Figure 14q.

1 Referring to Figure 13, account information is shown on a level one submenu 896 and
2 then follow-on submenus show the recent orders and your account balance 897. There is also
3 a level one submenu for outgoing messages 898 which has a follow-on submenu used as an
4 input screen 899.

5 In addition to the specific features and submenus described in Figure 13 and Figure 14a
6 through Figure 14q, many other variations and features are possible. Figure 14r is an example
7 of a main menu with additional features and submenus available.

8 When a book is finally selected for viewing on the system it will appear on the screen
9 as shown in Figure 14s for the title and Figure 14t for a page of text.

10 III. The Billing And Collection System

11 The billing and collection system utilizes the latest technology in electronic transaction
12 and telephone switching to track orders, authorize deliveries, bill consumers, and credit
13 publishers automatically. The telephone calls initiated by the phone connector are received by
14 the billing and collection system which responds immediately without human intervention by
15 placing the order and charging the consumers credit card account. Data is compiled
16 periodically and publishers are credited for sales of their books. The billing and collection
17 system may also connect with subscribers through two-way cable connections, cellular or other
18 communication means.

19 It is preferred that the billing and collection system communicate with the operations
20 center to track changes in available books and to provide statistical data to the operations
21 center.

22 IV. Library and Bookstore System

23 The electronic book system can be modified to be used at public libraries and
24 bookstores. Figure 15 shows one possible arrangement of components for a public library or
25 bookstore location. The main unit at public library or bookstore is the file server 900. The file
26 server 900 is a large electronic memory unit that can store thousands of books. Various

1 electronic storage means may be used in the file servers, such as hard disks and read-write CD
2 ROMs and read only CD ROMs.

3 The system comprises five components; a converter or video connector 904, a
4 controller 908, a viewer 912, and a catalog printer 916. The software for controlling the
5 system is primarily located in the controller. The converter or video connector 904 is similar
6 to those described above. In this configuration the controller unit 908 monitors the data being
7 transferred to the file server by the converter 904. The controller 908 is preferably provided
8 with a viewing screens and several control buttons. When it is necessary to have a larger
9 screen to perform more sophisticated controlling of the system a viewer may be connected to
10 the controller 908 and the viewer screen and controls may be used.

11 The controller 908 is only able to download books to the viewer 912 which are
12 authorized to receive books from the particular file server. For security reasons it is not
13 desirable that the public viewer 912 have access to more than one file server. In this way,
14 security can be maintained over the text data for books. It is preferred that the public viewer
15 912 be limited to receiving one or two books at a time from the controller 908. When the user
16 of the public viewer 912 needs a new or additional book he returns the viewer 912 to the
17 library where he receives a new book from the controller 908.

18 In order to track the books that are available on the file server, the titles of the available
19 books may be printed on a catalog printer 916. The catalog printer 916 is connected to the
20 library controller 908 and the titles of the books are downloaded to the catalog printer 916.
21 None of the coded text for any of the books can be printed using the controller 908 and
22 catalog printer 916 of this system. In order to maintain security over the data, none of the book
23 data is allowed to be downloaded to the printer. Once a complete printout of available book
24 titles, magazines, or other textual material is complete, a hard copy of the catalog 920 can be
25 maintained at the file server.

26 The system shown may also be used at bookstores. The bookstores can rent the
27 public viewer 912 to customers with the text for one or two books loaded onto the viewer 912.

1 The viewer 912 may be provided with an automatic timeout sequence. The timeout sequence
2 would erase the textual data for the books after a certain period of time, for example, two
3 weeks. It is expected that after a period of time (perhaps within two weeks) the renter would
4 return the public viewer 912 to the bookstore and receive additional books for viewing. Using
5 this arrangement, it is also possible for the bookstore to (permanently) sell a viewer 912 to a
6 regular customer. The customer then returns to the bookstore from time to time to receive
7 textual data for a book which the customer can then store permanently on his own viewer 912.
8 Various other configurations are possible for bookstores and libraries using the file server and
9 viewer 912 described.

10 V. Use Of Set Top Converter

11 Existing set top converter boxes such as those made by Scientific Atlanta or General
12 Instruments are presently unequipped to handle the book selection system of the present
13 invention. Although set top converters may be built which include the library functions,
14 hardware modifications are necessary in order to use the book selection system with existing
15 set top converter technology.

16 Figures 16a and 16b are examples of hardware modification. A port is used to attach
17 hardware upgrades described below to a set top terminal. Two upgrades are possible to set
18 top converters 601 to assist in receiving and selecting electronic books. A menu generation
19 card upgrade (Figure 16a) and an information download unit (Figure 16b). Each of these
20 upgrades may be connected to the set top terminal unit through an upgrade port. A four wire
21 a cable, ribbon cable or the like may be used to connect the upgrade to the set top converter
22 601.

23 A card addition 950 to a set top converter 601 is depicted in Figure 16a. The card
24 950 shown provides the additional functionality needed to utilize the book selection system with
25 existing set top converter 601 technology. The card 950 may be configured to slip inside the
26 frame of a set top terminal and become part of the set top terminal, an advanced set top
27 terminal. The primary functions the card 950 adds to the set top converter 601 are the

1 interpreting of data signals, generating of menus, sequencing of menus, and, ultimately, the
2 ability of the viewer 912 to select a book using either the television or a viewer 912. The card
3 950 also provides a method for a remote location, such as the cable headend, to receive
4 information on books ordered. The books ordered information and control commands may
5 be passed from the cable headend to the card 950 using telephone lines.

6 The primary components of the card 950 are a PC chip CPU 952, a VGA graphic
7 controller 954, a video combiner 956, logic circuitry 958, NTSC encoder 960, a receiver 962,
8 demodulator (not shown), and a dialer 611'. The card 950 operates by receiving the data text
9 signal from the cable headend through the coaxial cable. The logic circuitry 958 of the card
10 950 receives data 964, infrared commands 966, and synchronization signals (not shown) from
11 the set top converter 601. Menu selections made by the viewer 912 on the remote control are
12 received by the set top converter's 601 IR equipment and passed through to the card 950.
13 The card 950 interprets the IR signal and determines the book (or menu) the subscriber has
14 selected. The card 950 modifies the IR command to send the information to the set top
15 converter 601. The modified IR command contains the channel information needed by the set
16 top converter 601. Using the phone line 968 and dialer 611', the card 950 is able to transmit
17 books ordered information to the cable headend. It is also possible to receive the books over
18 the telephone lines and by-pass the video distribution system.

19 These commands are passed through the interface linking the set top terminal's
20 microprocessor with the microprocessor of the hardware upgrades. In this way, subscriber
21 inputs, entered through the set top terminal keypad or remote control, can be transferred to any
22 of the hardware upgrades for processing and responses generated therein can then be sent
23 back to the set top terminal for display. In the preferred embodiment the IR commands 966
24 are transferred from set top terminal 601 to hardware upgrade.

25 Hardware upgrades may include a microprocessor, interactive software, processing
26 circuitry, bubble memory, and a long-term memory device. In addition to these basic

1 components, the hardware upgrade may make use of an additional telephone modem or CD-
2 ROM device.

3 The information download hardware upgrade 1001 (shown in Figure 16b) allows the
4 subscriber to download large volumes of information from the operations center or cable
5 headend using the set top converter 601. The hardware upgrade 1001 will enable subscribers
6 to download data, such as books and magazines, to local storage. Primarily, the hardware
7 upgrade 1001 is an additional local storage unit 1003 (e.g., hard disk, floppy, optical disk or
8 magnetic cartridge and may include a microprocessor 1005, instruction memory 1007, and a
9 random access memory 1009, as shown in Figure 16b). Preferably, a small portable viewer
10 912 is also provided with the upgrade 1001 to enable downloaded text to be read without the
11 use of a TV.

12 The downloadable information may be text or graphics supplied by the operations
13 center or cable headend. With this upgrade, books may be downloaded and read anywhere
14 with the portable reader. Using this upgrade, books may be downloaded and stored in
15 compressed form for later decompression. The books would be decompressed only at the
16 time of viewing. Important text that the public desires immediate access may made available
17 through this system. Text such as the President's speech, a new law, or a recent abortion
18 decision rendered by the Supreme Court may be made immediately available.

19 In the preferred embodiment, book ordering information is stored at each set top
20 terminal until it is polled by the cable headend using a polling request message format. An
21 example of a polling request message format consists of six fields, namely: (1) a leading flag
22 at the beginning of the message, (2) an address field, (3) a subscriber region designation, (4)
23 a set top terminal identifier that includes a polling command/response (or P/F) bit, (5) an
24 information field, and (6) a trailing flag at the end of the message. A similar response frame
25 format for information communicated by the set top terminal to the cable headend in response
26 to the polling request may be used.

1 Figure 17 shows a preferred set top terminal that includes a data receiver 617' and a
2 data transmitter 1011. The data transmitter provides upstream data communications capability
3 between the set top terminal 601 and the cable headend. Upstream data transmissions are
4 accomplished using the polling system described and, using a data transmitter 1011. Both
5 receiver 617' and transmitter 1011 may be built into the set top terminal 601 itself or added
6 through an upgrade module. Regardless of the specific hardware configuration, the set top
7 terminal's data transmission capabilities may be accomplished using the hardware shown in
8 Figure 17.

9 Figure 17 shows RF signals, depicted as being received at by a data receiver 617' and
10 tuner 613 working in unison. Both of these devices are interfaced with the microprocessor
11 1013, which receives inputs 1015, from the subscriber, either through a set top terminal's
12 keypad, a remote control unit or viewer 912. All cable signals intended for reception on the
13 subscriber's TV are accessed by the tuner 613 and subsequently processed by the processing
14 circuitry 1017. This processing circuitry 1017 typically includes additional components (not
15 shown) for descrambling, demodulation, volume control and remodulation on a Channel 3 or
16 4 TV carrier.

17 Data targeted to individual set top terminals is received by the data receiver 617'
18 according to each set top terminal's specific address or ID. In this way, each addressable set
19 top terminal only receives its own data. The data receiver 617' may receive set top terminal
20 601 specific data in the information field of the signal frame described or on a separate data
21 carrier located at a convenient frequency in the incoming spectrum.

22 Any received data includes information regarding books and menus available for
23 selection. The subscriber may enter a series of commands 1015 using a keypad or remote
24 control in order to choose a channel or program. Upon receipt of such commands, the set top
25 terminal's microprocessor 1013 instructs the tuner to tune to the proper frequency of the
26 channel carrying data and subsequently instructs the processing circuitry 1017 to begin
27 descrambling of this data.

1 Upon selection of a book, the microprocessor 1013 stores any selection information
2 in local memory (not shown) for later data transmission back to the cable headend. The set top
3 terminal's microprocessor 1013 coordinates all CATV signal reception and also interacts with
4 various upstream data transmission components. Typically, the data transmitter 1011 operates
5 in the return frequency band between 5 and 30 MHZ. In an alternative embodiment, the
6 frequency band of 10 to 15 MHZ may be used. Regardless, however, of the frequency band
7 used, the data transmitter 1011 sends information to the cable headend in the information field
8 of the response frame described. Those skilled in the art will recognize that a number of
9 variations and combinations of the above-described set top terminal hardware components may
10 be used to accomplish upstream data transmissions.

11 VI. Books-On-Demand System

12 The electronic book system described may also be configured in a book-on-demand
13 style. Figure 18a shows one example of a configuration for a book-on-demand system. A
14 book on demand system requires more powerful two-way communications between the
15 consumer's home, bookstore or library and either the operations center or a distribution site
16 1020 such as the cable headend. This type of two-way communication can be provided by
17 the hardware shown in Figure 17 and described above.

18 Referring to Figure 18a, in a book-on-demand system, the subscriber selects the book
19 to be download from an available menu of books. The available menu is usually sent to the
20 subscriber location by the distribution site 1020. After his selection, information about his
21 selection (or request) is then communicated to either a distribution point 1020 (such as a cable
22 headend) or the operations center. Upon receipt of this request, the needed textual and
23 graphical information for the book is spooled and sent to the subscriber. In this manner, books
24 are only sent when requested by the subscriber and are sent immediately upon demand for the
25 book.

26 In order to support such a demand system, the text delivery and distribution must be
27 conducted on a strong nodal architected distribution system, such as, a video-on-demand

1 cable or telephone television system, or through use of individual telephone calls on the public
2 telephone system.

3 The book-on-demand system allows for a greater selection of books to the subscriber
4 and limits the amount of communicated book data that is unnecessary or unneeded. It also
5 provides the book to the subscriber in a much timelier fashion.

6 In addition to a stronger distribution system, a book-on-demand system requires a
7 distribution point 1020 to have more sophisticated equipment to spool out the textual
8 information. This can be accomplished using file server technology 1024 for storing the books
9 and ATM 1028 or telephone-type switching (not shown) to distribute the textual information.
10 The file server 1024 and distribution technology that can be used in configuring such a book-
11 on-demand system is described in U.S. Patent No. 5,262,875 and U.S. Patent 5,218,695,
12 cited above.

13 Figure 18a shows an embodiment for a book-on-demand system that utilizes file server
14 technology. In addition to books, the embodiment of Figure 18a will support distribution of
15 nearly any digital data. Books or textual files are received from publishers 282 and other
16 sources through local feeds 1032, ATM 1028, or by satellite dish 1036. The data is then
17 stored in memory 1040 at the file server 1024. Preferably, distribution point 1020 is a cable
18 headend that receives requests from subscribers and delivers text to subscribers over a two-
19 way communication system (such as a video-on-demand system (VOD) 1044).

20 The library unit 262 can be connected to either a basic premium-type service cable
21 system 1048, a near video-on-demand type cable system (or pay-per-view (PPV) 1052) or
22 a video-on-demand cable system 1044. In connecting with either of these three systems the
23 library 262 may access the cable directly or may access the system through a set top terminal
24 601', 601", or 601'''.

25 Using the two-way video-on-demand system 1044, a subscriber is able to request a
26 specific book title and receive that text immediately following its request. To accomplish this,
27 the distribution point 1020 transmits a list of available books through the cable delivery system

1 to the library 262. The library 262 displays the list of available books on a menu or similar
2 format. As described earlier, it is preferred that the library 262 use menus which list categories
3 of available books to form its request from the distribution point 1020. After selecting a book
4 the library 262 then sends a request signal on the two-way communication system 1044 back
5 to the distribution point 1020. This request signal can be handled in two ways. Either the
6 library 262 initiates the request or the distribution point 1020 polls the various libraries on to
7 the two-way system 1044. Upon receiving the request for the book title, the text associated
8 with that book title is transmitted to the library 262 using the two-way cable system 1044.

9 Figure 18b is an expanded view of an operations center 250 that supports a regional
10 or national book-on-demand system. In fact, the operations center 250 shown supports
11 distribution of nearly any digital data. The operations center 250 supports multiple feeds to
12 receive digital information by tape 1060, 1060', ATM 1028, or satellite 1036. The information
13 is processed through an input MUX 1064 and a small file server 1068 before reaching the
14 master file server 1072. Digital data such as books received from publishers 282 is then stored
15 on the master file server 1072. It is preferred that the digital data is stored compressed in a
16 standard format such as MPEG2.

17 A system controller 1076 provides control over the regional or national book-on-
18 demand system. Books may be packaged into groups to provide feeds to various cable
19 headends. In addition, scheduling and marketing research are conducted at the operations
20 center 250. In order to handle the scheduling and market research, book buy data is received
21 at the operations center 250 through a multiplexer 1082. Book buy information can be
22 provided by the operation center 250 to the billing and collection subsystem.

23 The operations center 250 is also equipped to insert messages or advertisements into
24 the file server. These messages or advertisements will eventually be received by the
25 subscribers.

26 The master file server 1072 uses an output multiplexer 1080 and ATM 1028 as well
27 as satellite connections to distribute digital data. In the preferred embodiment, cable headends

1 receive text data on books from the master file server 1080 through the output multiplexer
2 1028 and an ATM system 1028. After receiving the digital book data, the cable headends
3 store the books in a local file server 1024. Figure 18a's distribution point 1020 is an example
4 of a cable headend which may receive data from the operations center 250 of Figure 18b
5 through an ATM hookup 1088 or satellite hookup.

CLAIMS

What is claimed is:

1. A method of communicating between components of a home subsystem for processing electronic books, the method comprising:
 - sending data text related to an electronic book from a library to a viewer;
 - comparing a viewer identifier associated with the viewer with a data identifier associated with the data text; and
 - if the viewer identifier matches the data identifier, storing the data text in the viewer.
2. The method of claim 1, further comprising encrypting the data text.
3. The method of claim 2, further comprising preventing the viewer from outputting decrypted data text.
4. The method of claim 2, further comprising:
 - displaying the data text on a display portion of the viewer; and
 - decrypting the data text as the data text is displayed.
5. The method of claim 1, further comprising compressing the data text.
6. The method of claim 5, further comprising preventing the viewer from outputting decompressed data text.
7. The method of claim 5, further comprising:
 - displaying the data text on a display portion of the viewer; and
 - decompressing the data text as the data text is displayed.

8. The method of claim 1, wherein the data text is encrypted and compressed when it is received by the viewer, and further comprising decompressing and decrypting a portion of the data text.

9. The method of claim 1, further comprising encrypting and compressing the data text before it is sent to the viewer, and further comprising decompressing and decrypting the data text one page at a time, as a current page is displayed on the viewer.

10. The method of claim 1, wherein the viewer has a unique key for decrypting the data text, whereby only one viewer can access a particular transmission of data text.

11. The method of claim 1, wherein the data text is transmitted as a digital bit stream.

12. The method of claim 1, wherein the data text is transmitted from a remote cable headend to the library and bundled into a data file, which data file is sent to the viewer.

13. A method for processing text data for an electronic book comprising:
 receiving a packet of text data;
 determining whether the packet has a unique packet identifier; and
 if the packet has a unique packet identifier, determining whether the packet identifier matches a library identifier of a library; and
 if the packet identifier matches the library identifier, storing the packet to a data file in a library storage.

14. The method of claim 13, wherein the packet is received by the library.

15. The method of claim 14, wherein the packet is transmitted as a digital bit stream from a remote cable headend to the library.

16. The method of claim 13, further comprising, if the packet does not have a unique packet identifier, storing the packet to an electronic message file.

17. The method of claim 13, wherein the step of storing comprises:
determining whether the data file has been opened, and
if the data file has been not been opened,
opening the data file; and
storing the packet to the data file.

18. The method of claim 17, further comprising:
determining whether the packet is a final packet received for an electronic book, and
if the packet is the final packet,
closing the data file; and
updating a directory.

19. The method of claim 13, further comprising sending the data file to a viewer.

20. The method of claim 19, further comprising encrypting and compressing the data file.

21. A method for processing data text for electronic books comprising:
sending a packet of data text from a remote operations center to a library;
encrypting and compressing the packet;
sending the packet to a viewer communicatively coupled to the library;
storing the packet in a viewer storage;

1 decompressing and decrypting the packet; and
2 displaying the data text on a display of the viewer.

3 22. The method of claim 21, further comprising storing the packet to a data file in the
4 library, which data file is capable of storing a plurality of packets related to an electronic book.

5 23. The method of claim 22, wherein the step of encrypting and compressing the packet
6 comprises encrypting and compressing the data file, and wherein the step of sending the packet
7 to the viewer comprises sending the data file to the viewer.

8 24. The method of claim 21, wherein the data packet is sent in a bit stream having a packet
9 identifier, and further comprising comparing a packet identifier with a library identifier, and
10 wherein the step of sending the packet to the library comprises sending the packet to the library
11 if the packet identifier matches the library identifier.

12 25. The method of claim 24, wherein the step of decompressing and decrypting the data
13 file comprises using a security key unique to the viewer.

14 26. The method of claim 21, wherein the step of decompressing and decrypting comprises
15 decompressing and decrypting a page of an electronic book at a time, as the page is displayed
16 on the display.

ABSTRACT

The invention, an electronic book selection and delivery system, is a new way to distribute books and other textual information to bookstores, libraries and consumers. The primary components of the system are a subsystem for placing text in a video signal format and a subsystem for receiving and selecting text that is placed in the video signal format. The system configuration for consumer use contains additional components and optional features that enhance the system, namely: (1) an operation center, (2) a video distribution system, (3) a home subsystem, including reception, selection, viewing, transacting and transmission capabilities, and (4) a billing and collection system. The operation center and/or video distribution points perform the functions of manipulation of text data, security and coding of text, cataloging of books, messaging center, and uplink functions. The home subsystem performs the functions of connecting to a video distribution system, menu selecting text, storing text, and transacting through phone or cable communicating mechanisms. A portable book-shaped viewing device is used for viewing the textual material delivered. The billing and collection system performs the transaction, management, authorization, collection and publisher payments automatically utilizing the telephone system.

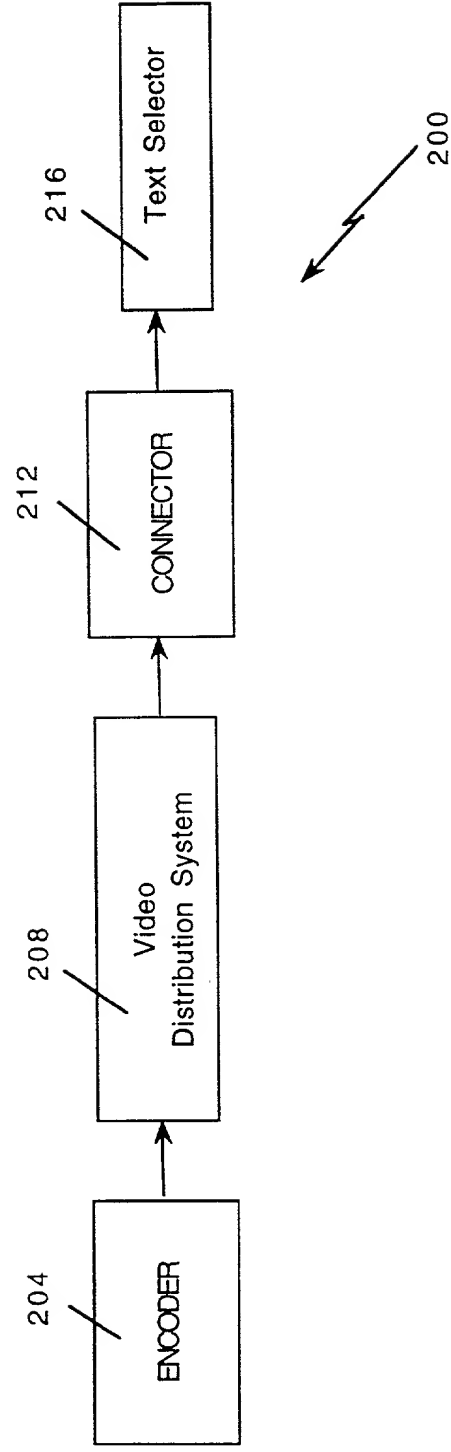


Fig. 1

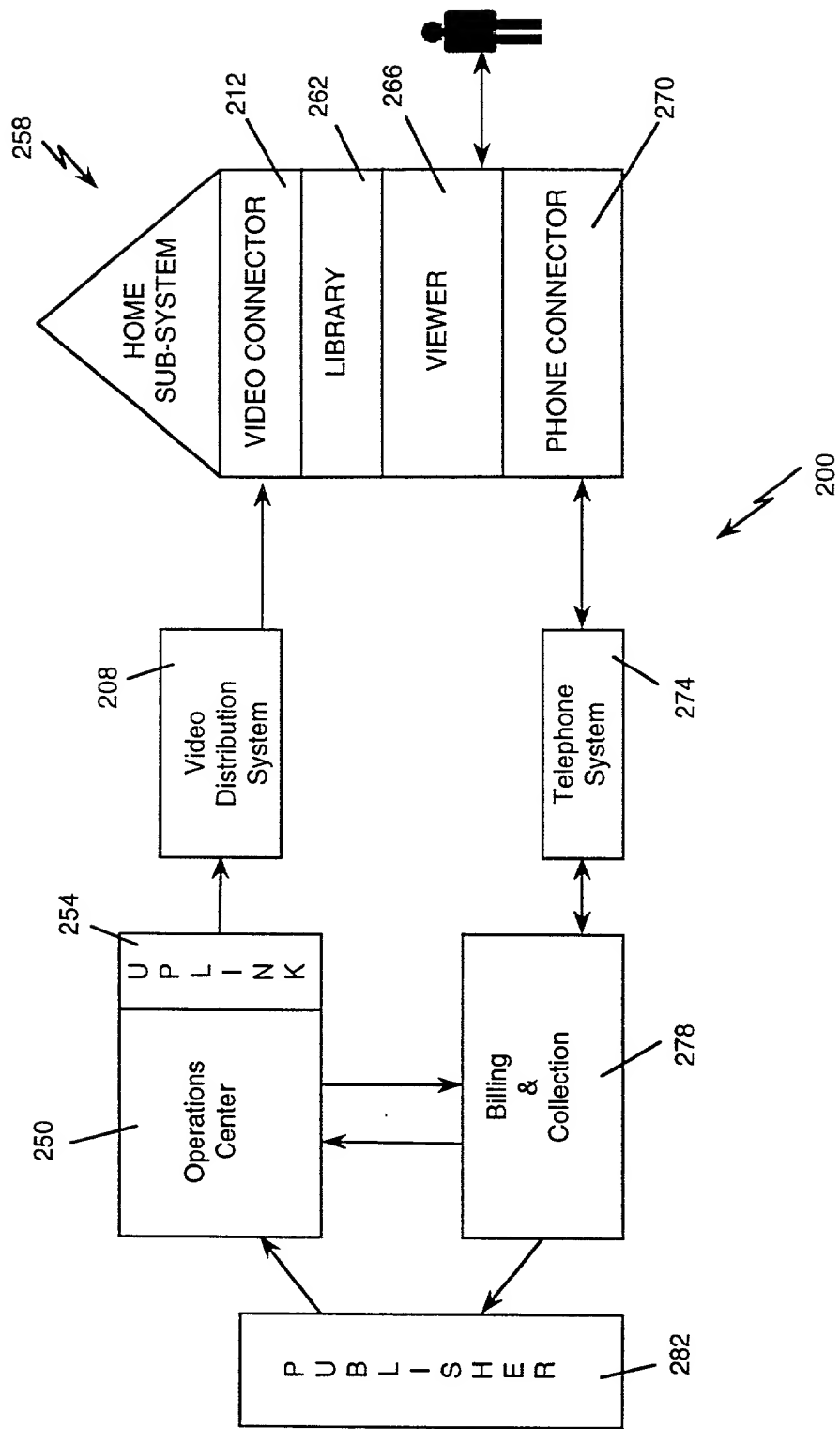
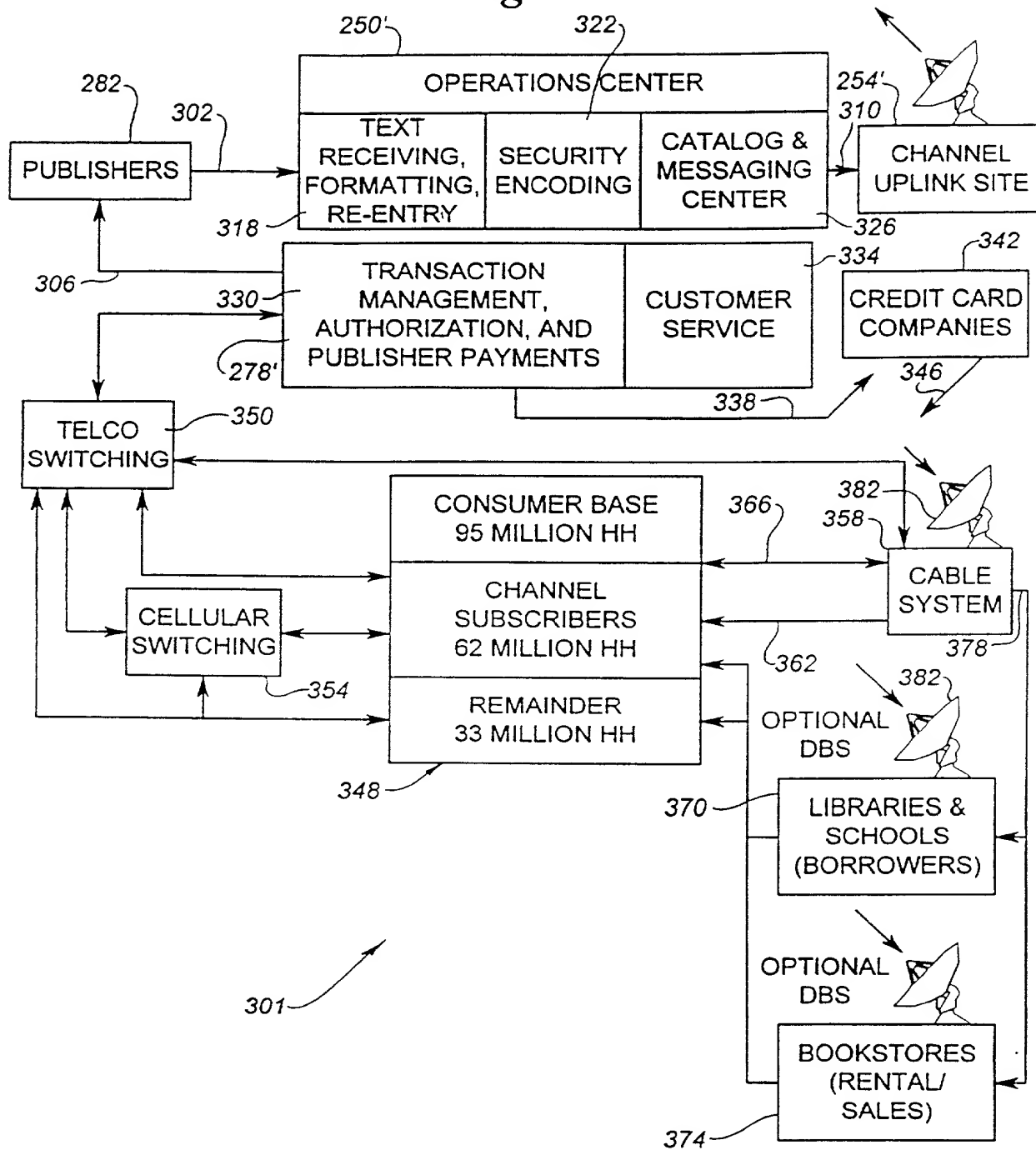


Fig. 2

Fig. 3



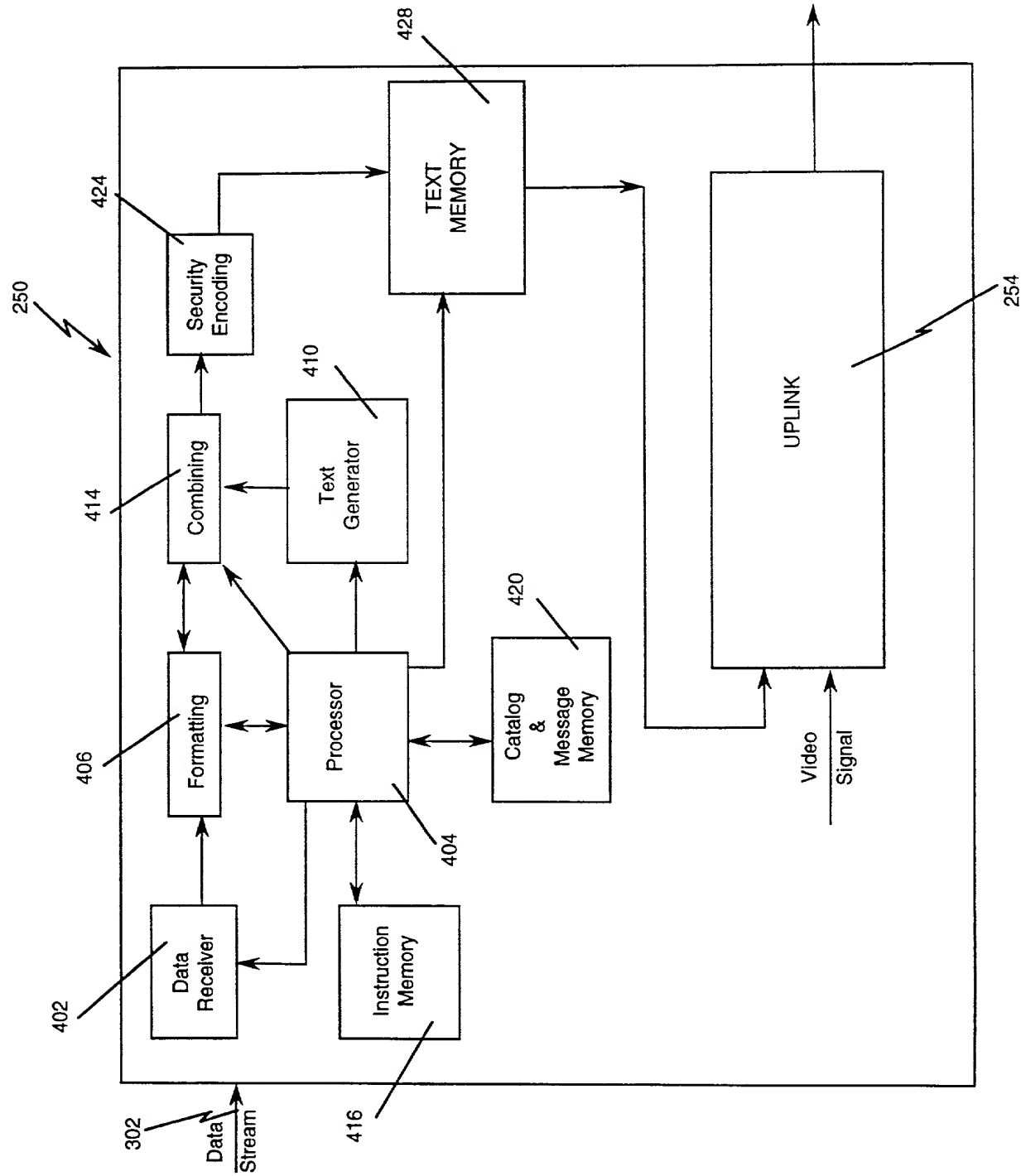


Fig. 4

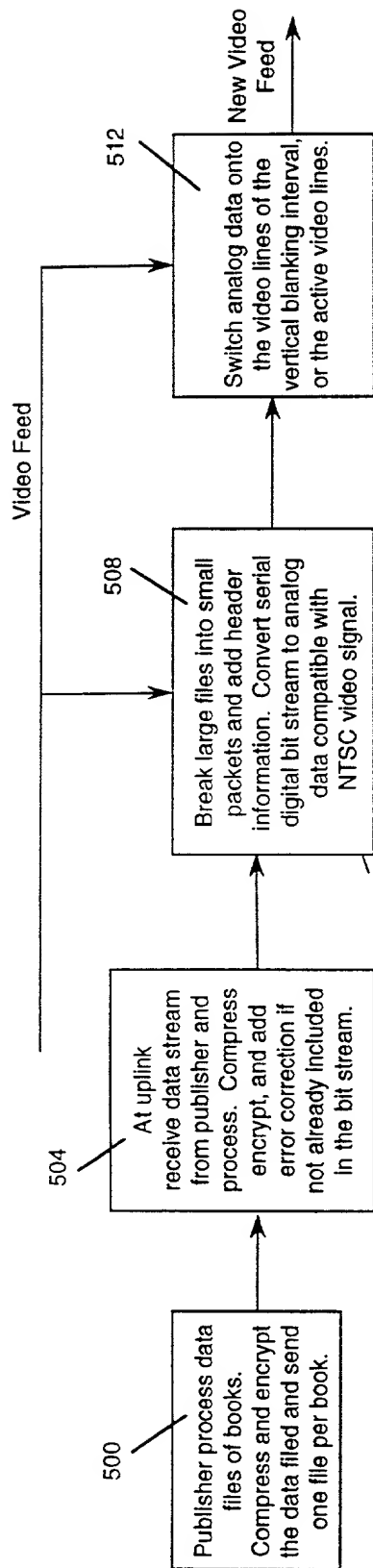


Fig. 5a

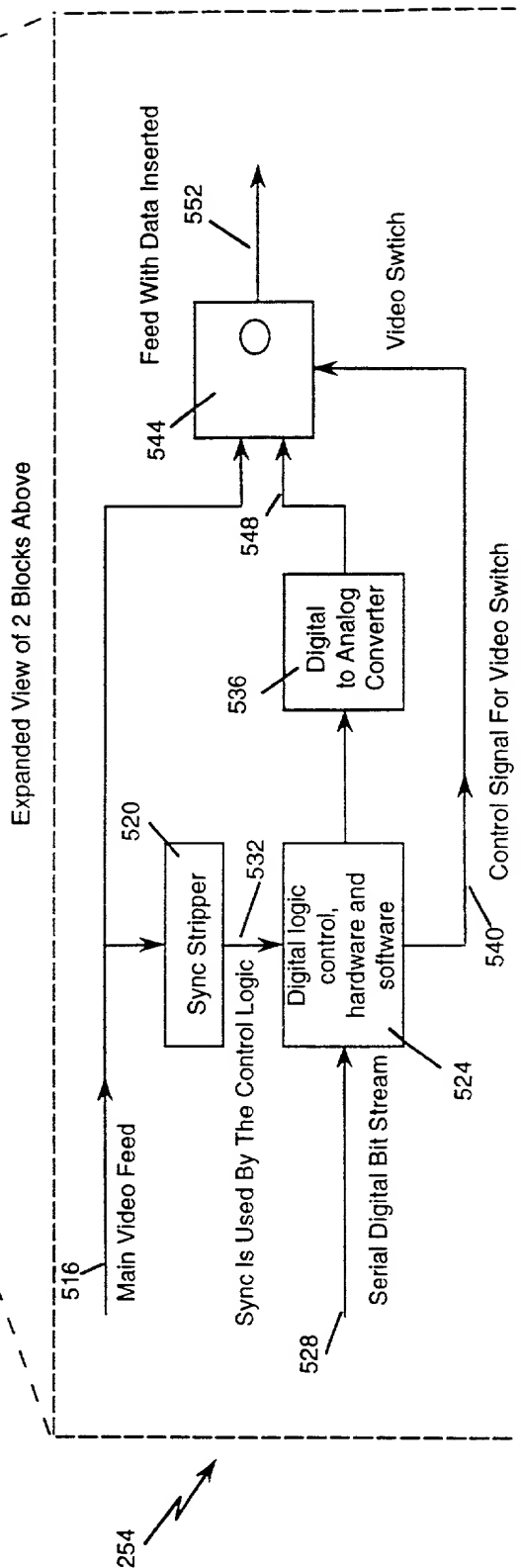


Fig. 5b

09/25/94 11:00

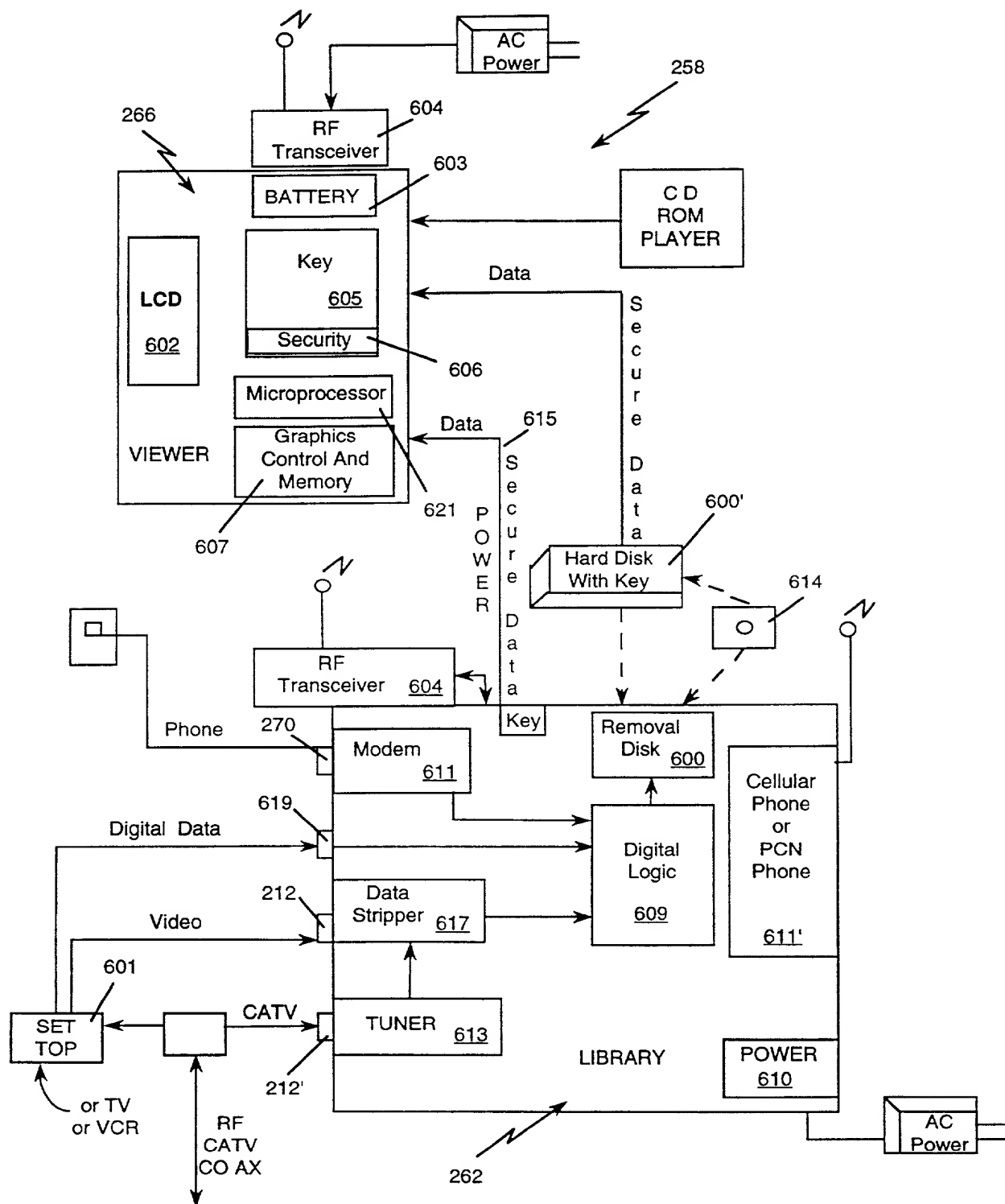


Fig. 6b

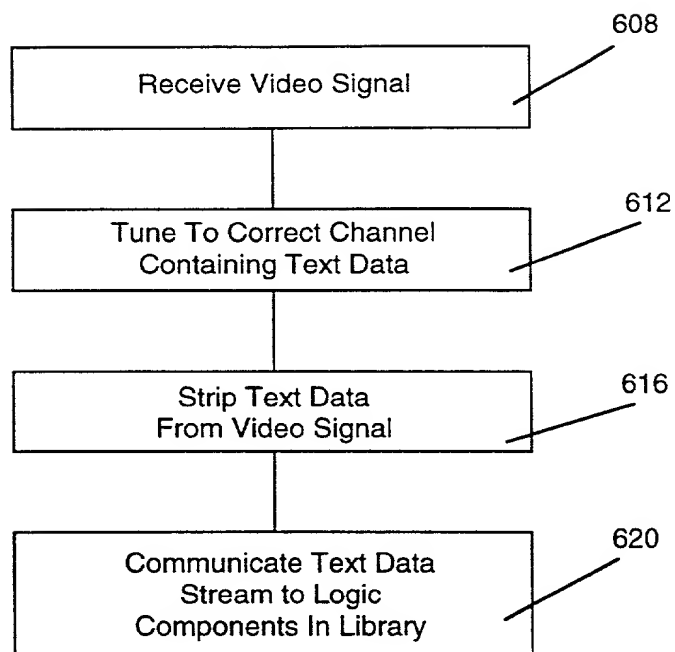


Fig. 7

LIBRARY

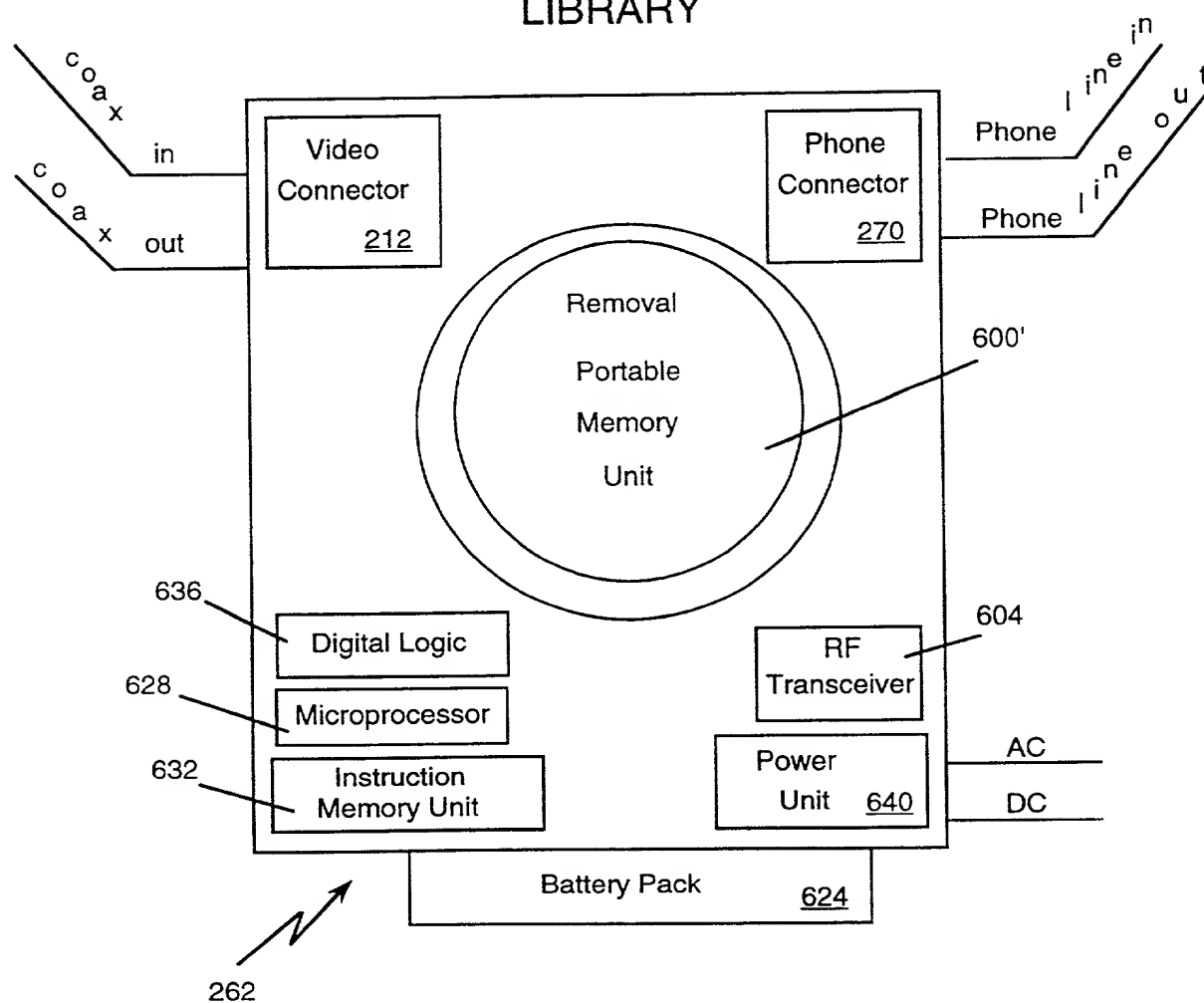
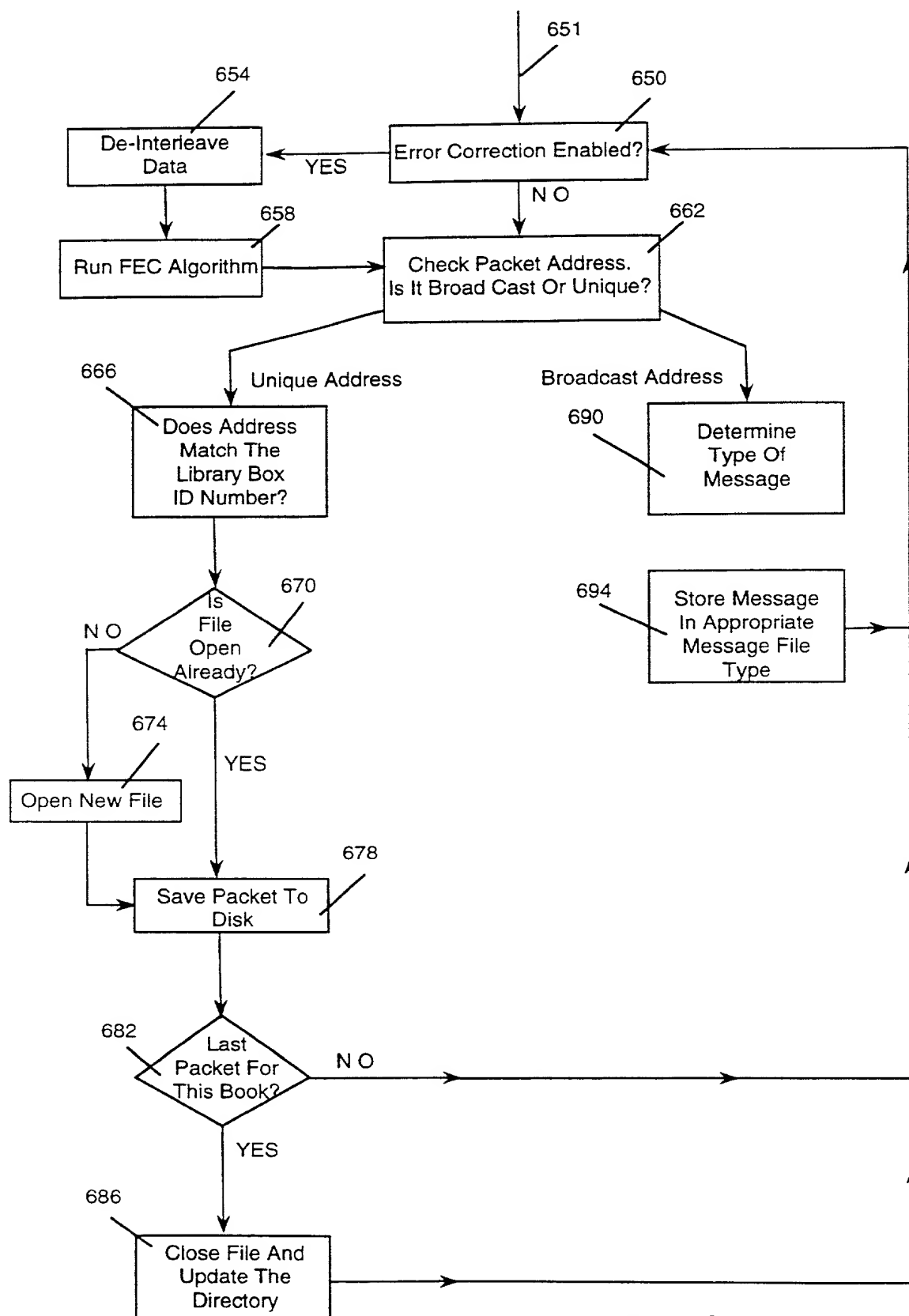


Fig. 8



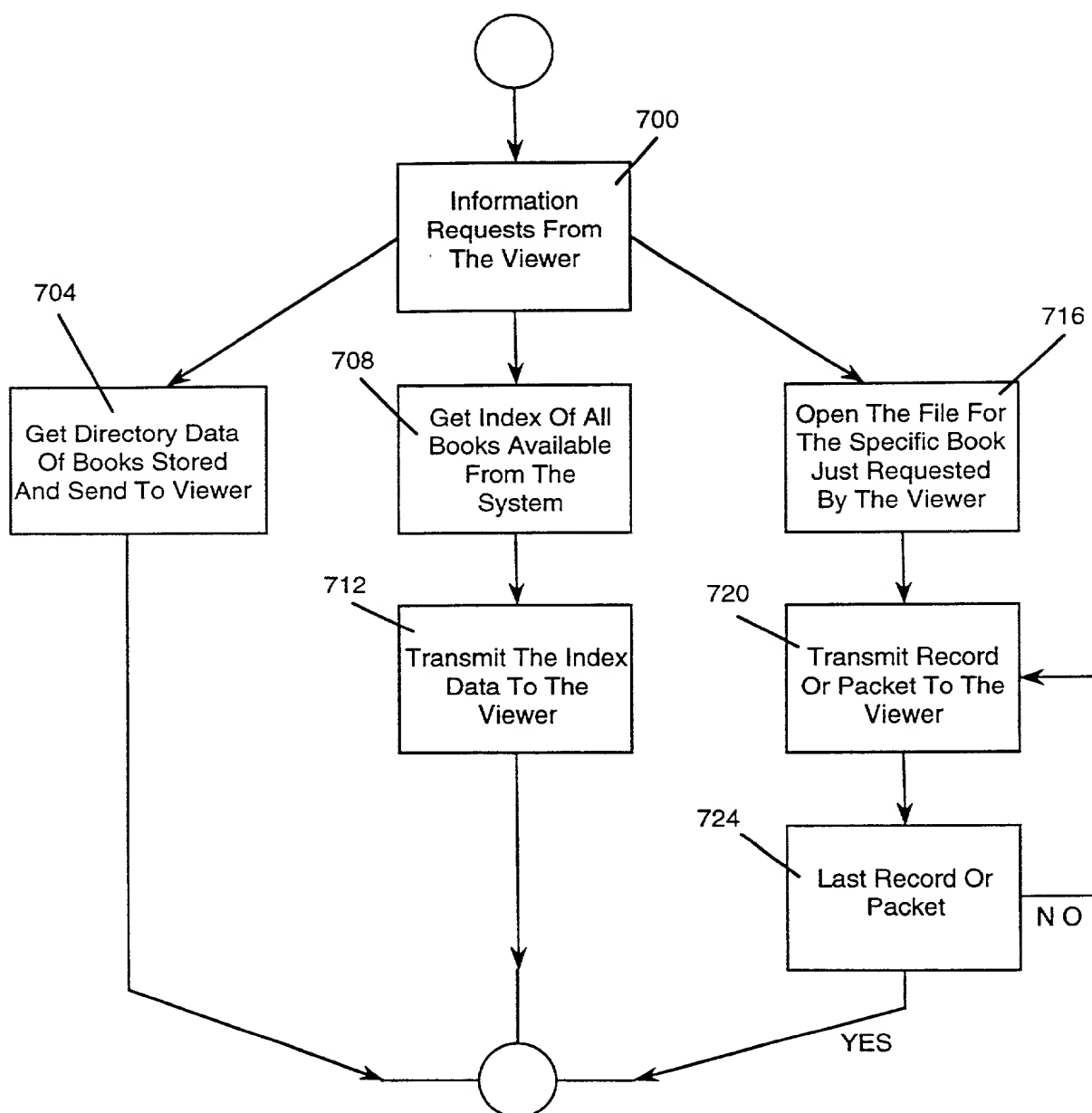


Fig. 10

Figure 1: Schematic representation of the experimental design. The figure is divided into two main sections: 'Pretest' and 'Main Experiment'. The 'Pretest' section includes a 'Pretest' box with 'Pretest' and 'Pretest' labels, and a 'Pretest' box with 'Pretest' and 'Pretest' labels. The 'Main Experiment' section includes a 'Main Experiment' box with 'Main Experiment' and 'Main Experiment' labels, and a 'Main Experiment' box with 'Main Experiment' and 'Main Experiment' labels. The 'Main Experiment' section also includes a 'Main Experiment' box with 'Main Experiment' and 'Main Experiment' labels, and a 'Main Experiment' box with 'Main Experiment' and 'Main Experiment' labels.

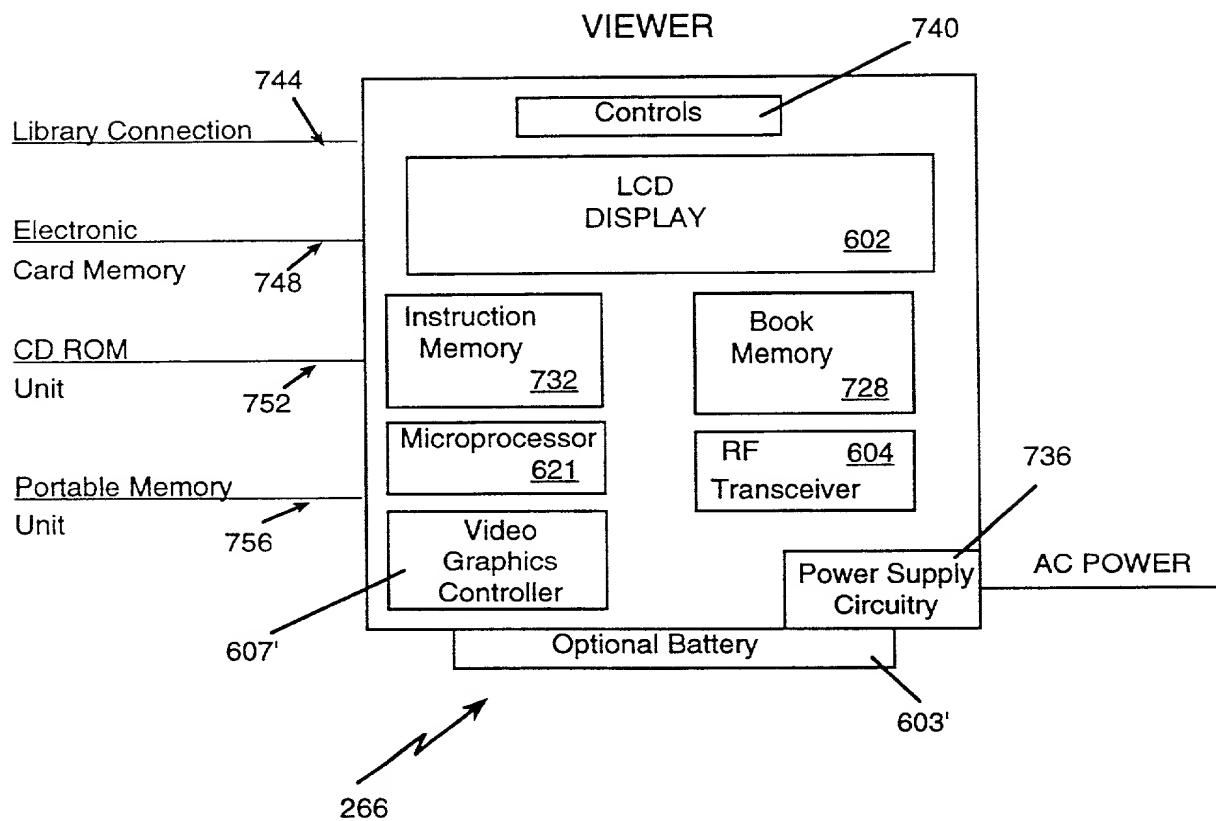


Fig. 11

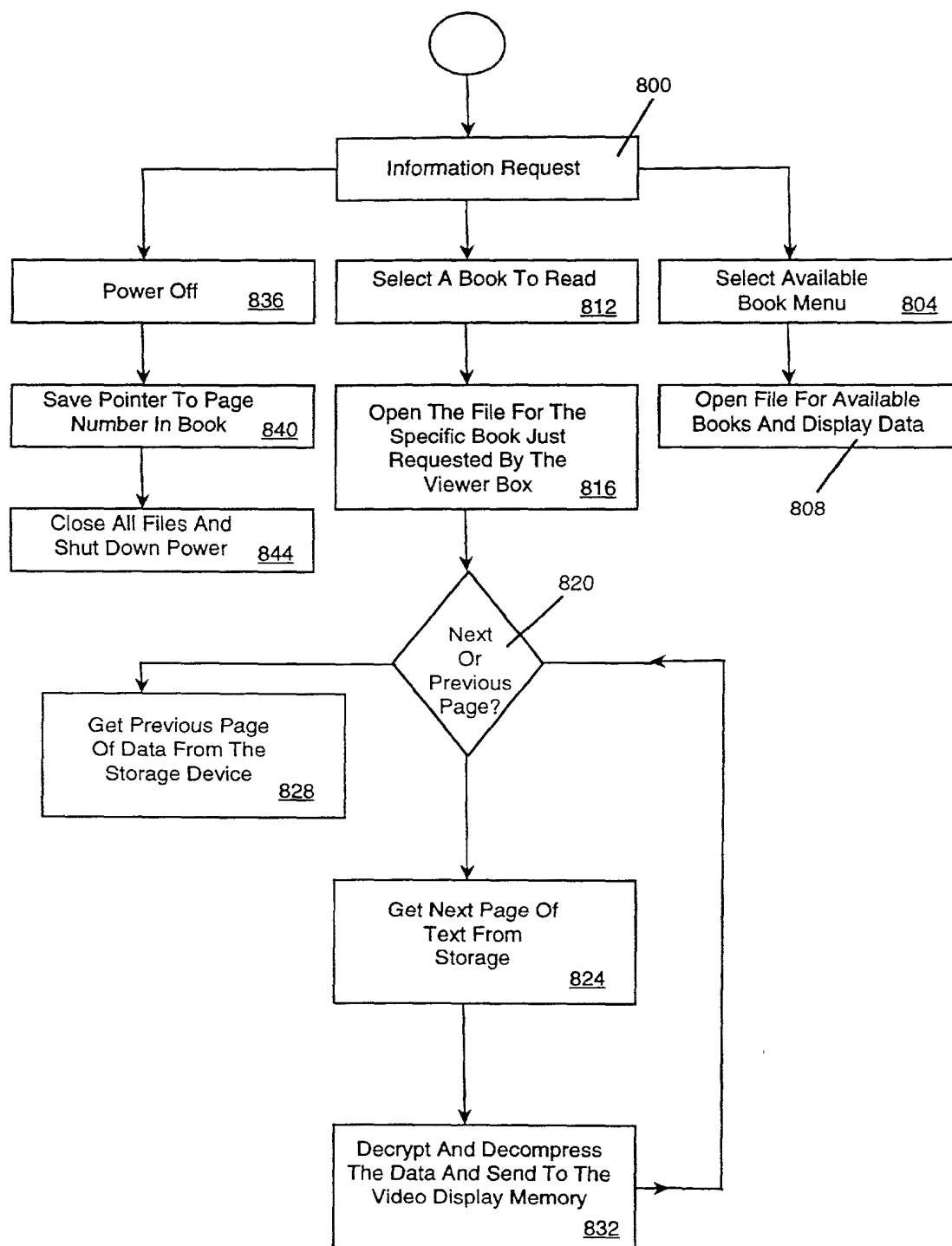


Fig. 12

Fig. 14a

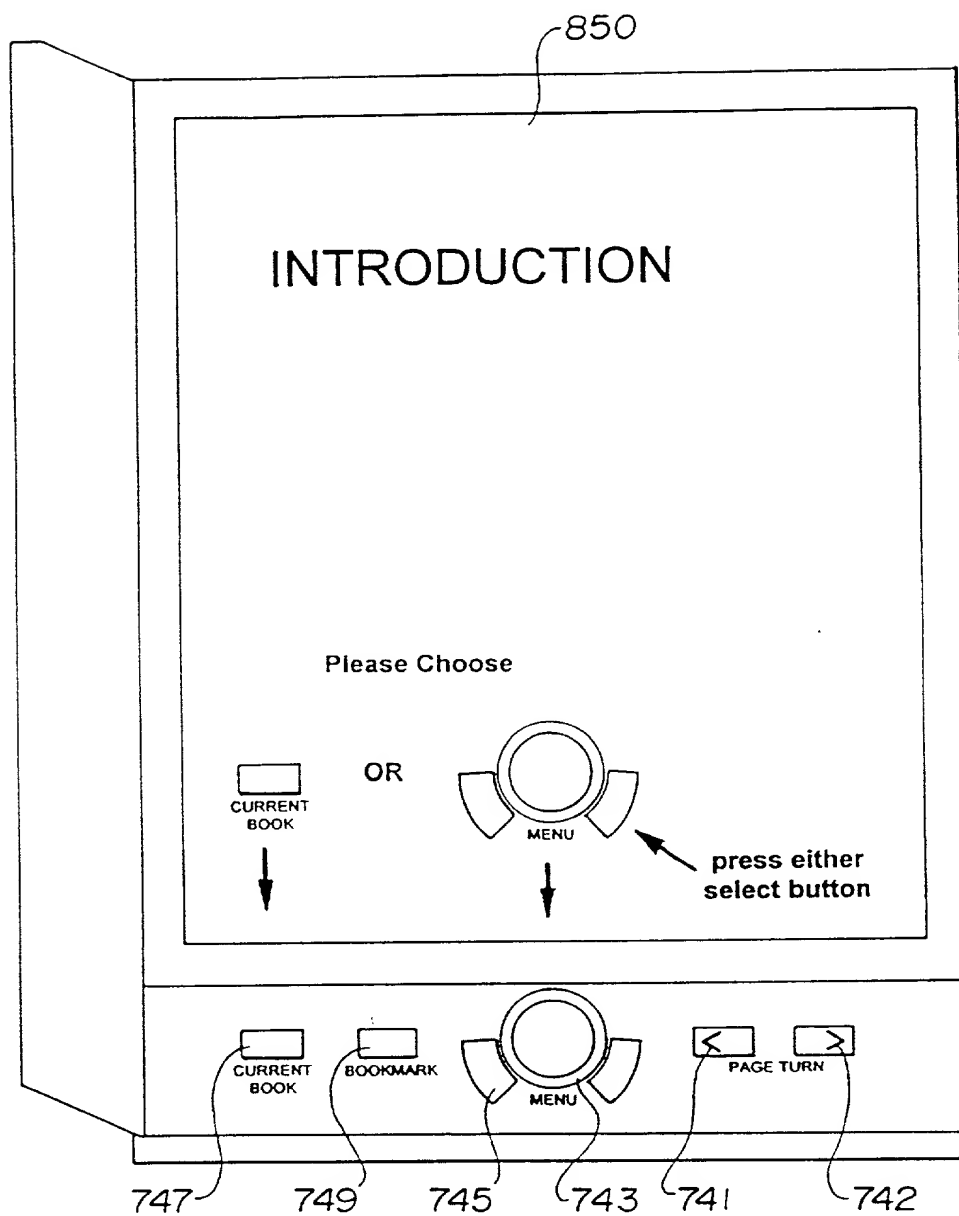


Fig. 14b

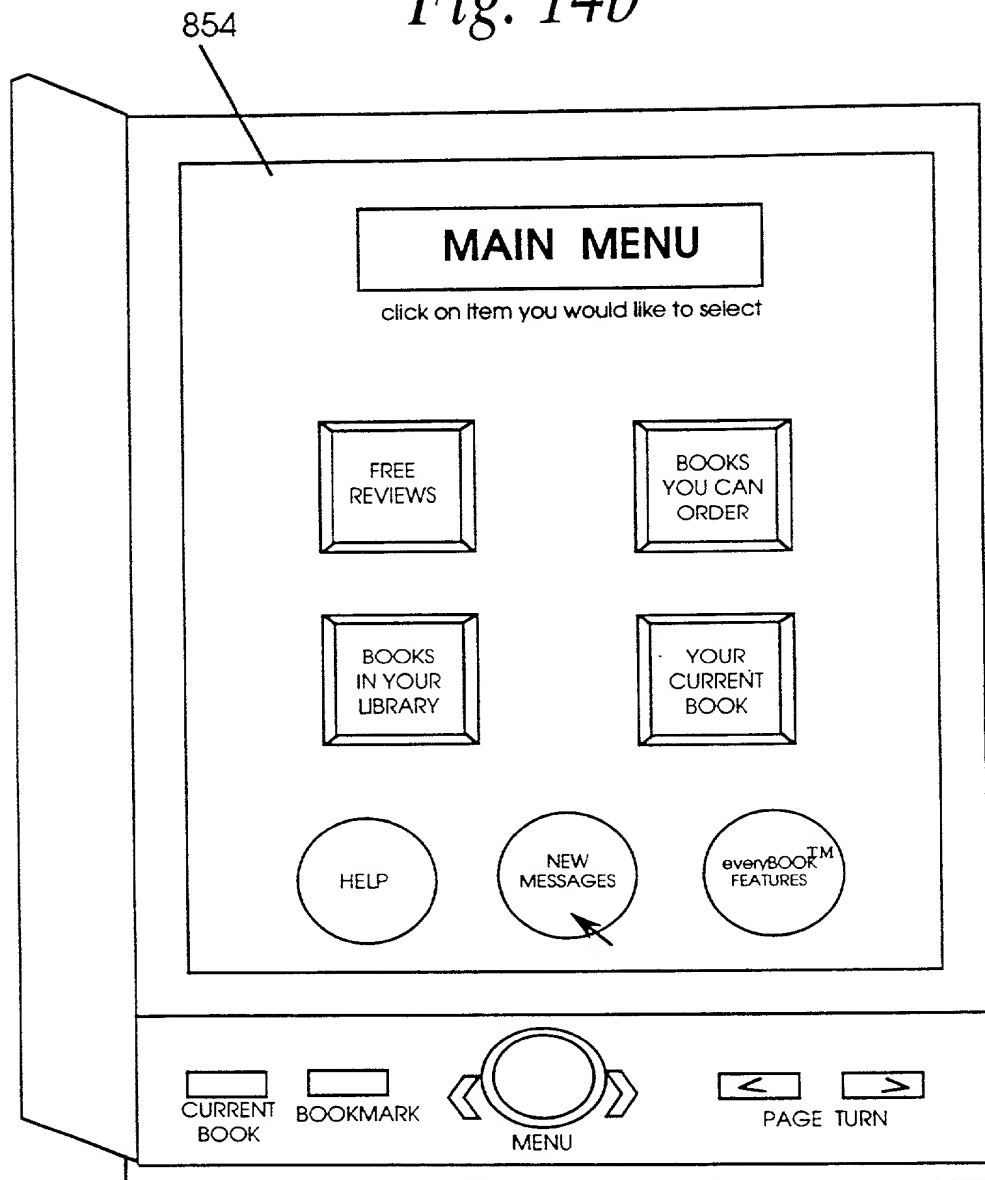


Fig. 14c

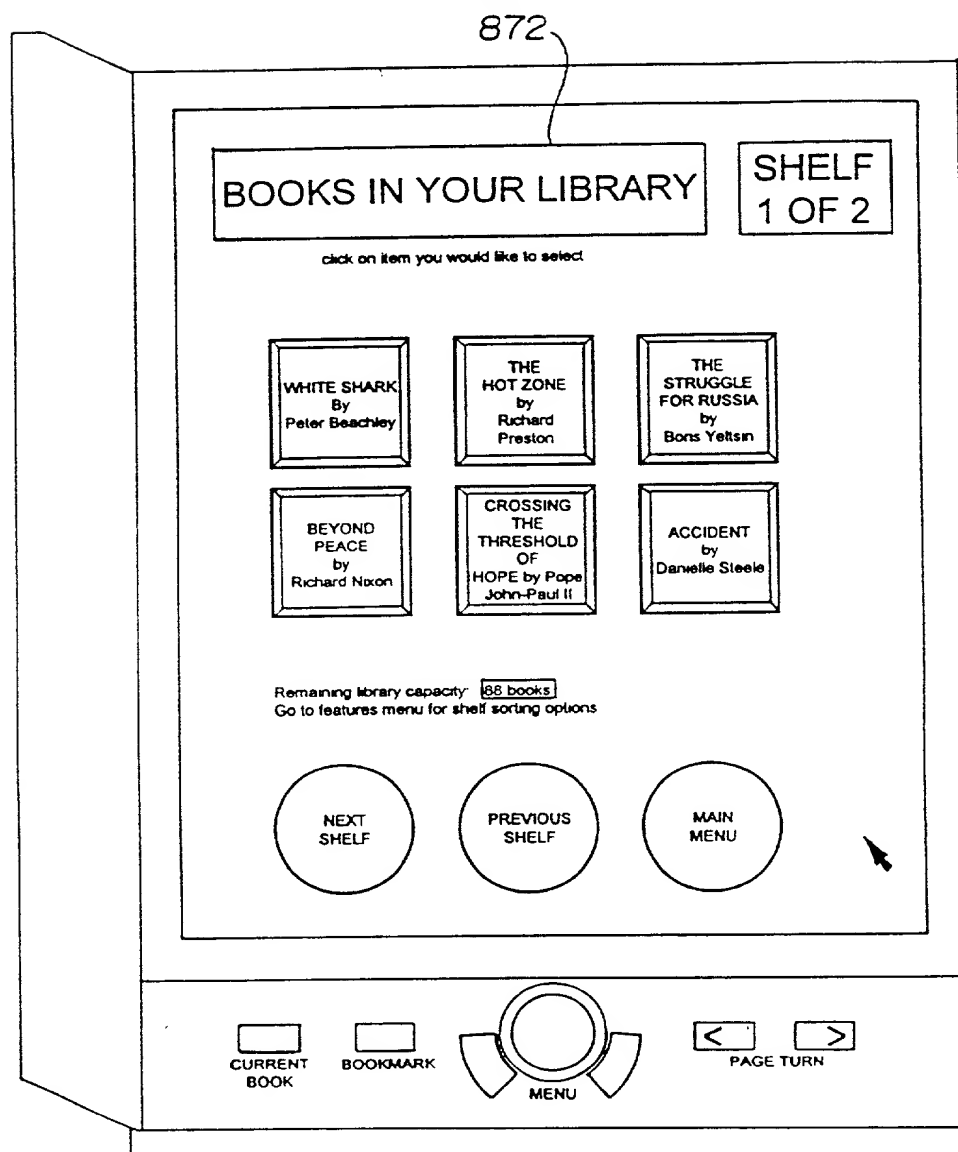
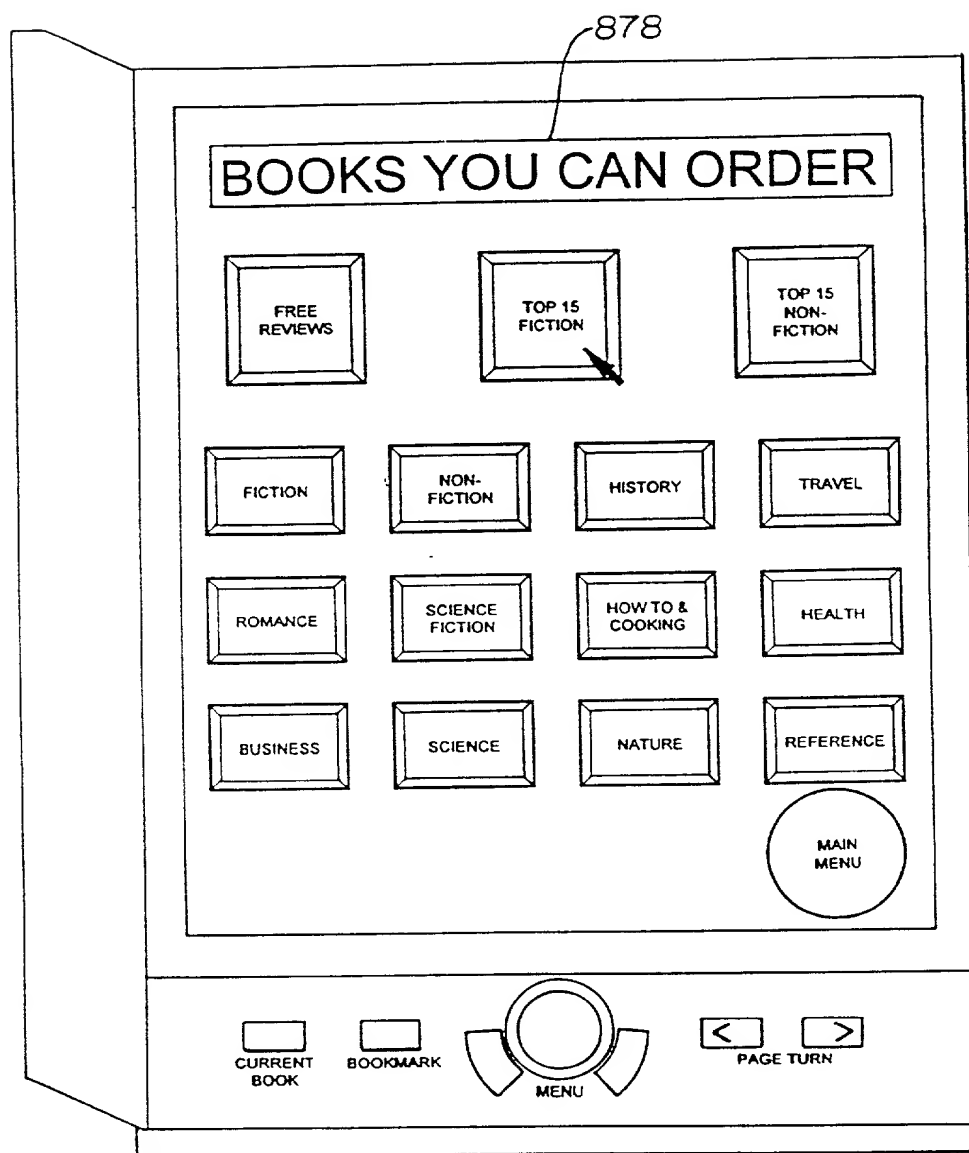


Fig. 14d



-880

880

BOOKS YOU CAN ORDER

TOP 15
FICTION

- 1 Select title
- 2 Select order method
- 3 Select ORDER button

AVAILABLE TITLES

Title	Author	Retail Price
1 North of Harts	T. Farcy	\$24.95
2 Accident	D. Steel	\$23.95
3 Disclosure	M. Crichton	\$24.00
4 Bridges of Madison County	P. Waller	\$16.95
5 Slow Waltz in Cedar Bend	P. Waller	\$16.95
6 Like Water for Chocolate	L. Esquirel	\$17.95
7 Bad Love	J. Kellerman	\$22.95
8 Fatal Cure	R. Cook	\$22.95
9 Family Blessings	L. Spencer	\$22.95
10 Cat Who Came to Breakfast	L. Braun	\$19.95
11 Honor Bound	W. B. Griffin	\$22.95
12 The Client	J. Grisham	\$15.95
13 Winter Prey	J. Sandford	\$15.95
14 Schindler's List	T. Keneally	\$15.95
15 Prime Witness	S. Martini	\$15.95

everyBOOKTM
ORDER METHOD

Cable	Phone	Cellular
\$2.95	\$4.95	\$8.95
\$2.95	\$4.95	\$8.95
\$2.95	\$4.95	\$8.95
\$2.95	\$4.95	\$8.95
\$2.95	\$4.95	\$8.95
\$2.95	\$4.95	\$8.95
\$2.95	\$4.95	\$8.95
\$2.95	\$4.95	\$8.95
\$2.95	\$4.95	\$8.95
\$2.95	\$4.95	\$8.95
\$2.95	\$4.95	\$8.95
\$2.95	\$4.95	\$8.95
\$2.95	\$4.95	\$8.95
\$2.95	\$4.95	\$8.95
\$2.95	\$4.95	\$8.95

ORDER

CANCEL
ABOVE

PREVIOUS
MENU

MAIN
MENU

CURRENT
BOOK

BOOKMARK

MENU

< >
PAGE TURN

Fig. 14f

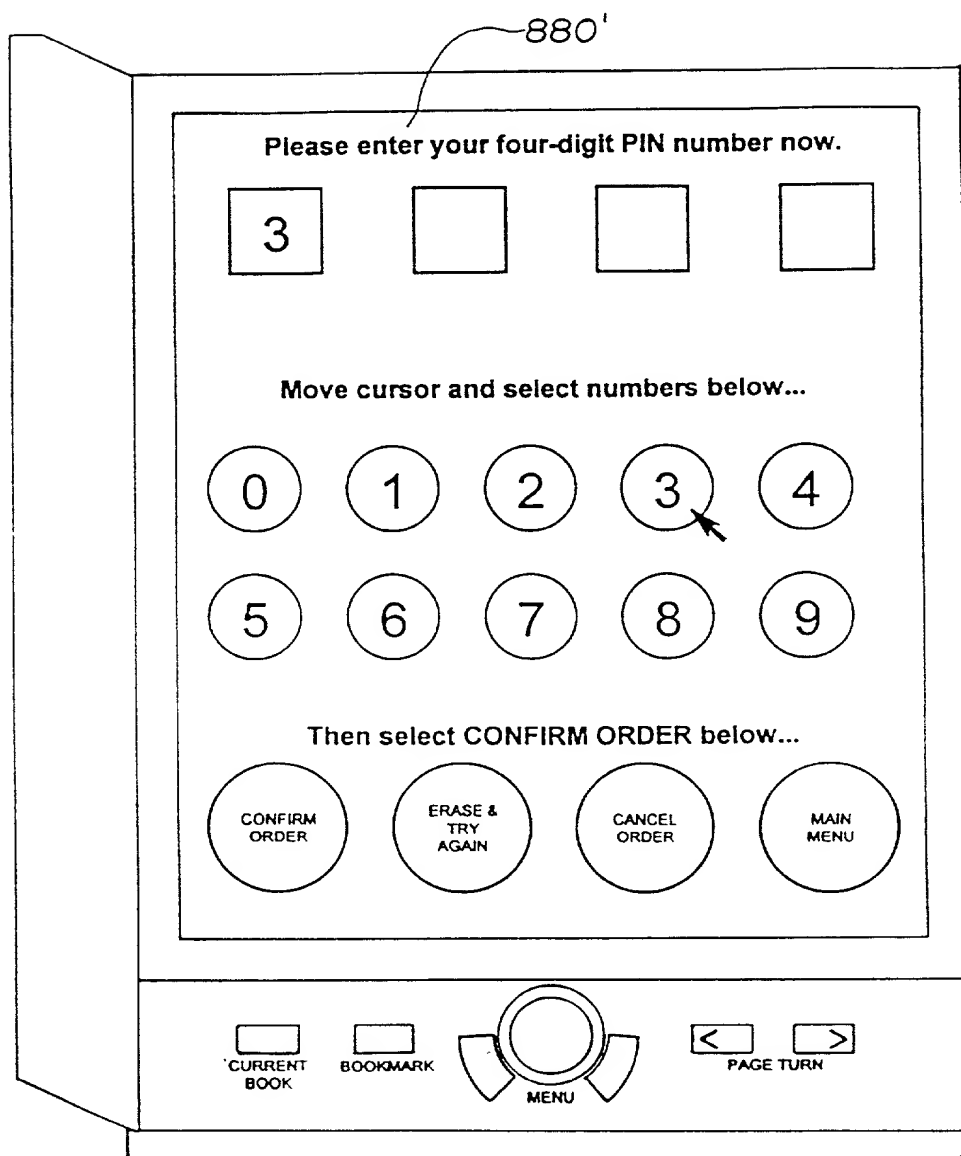
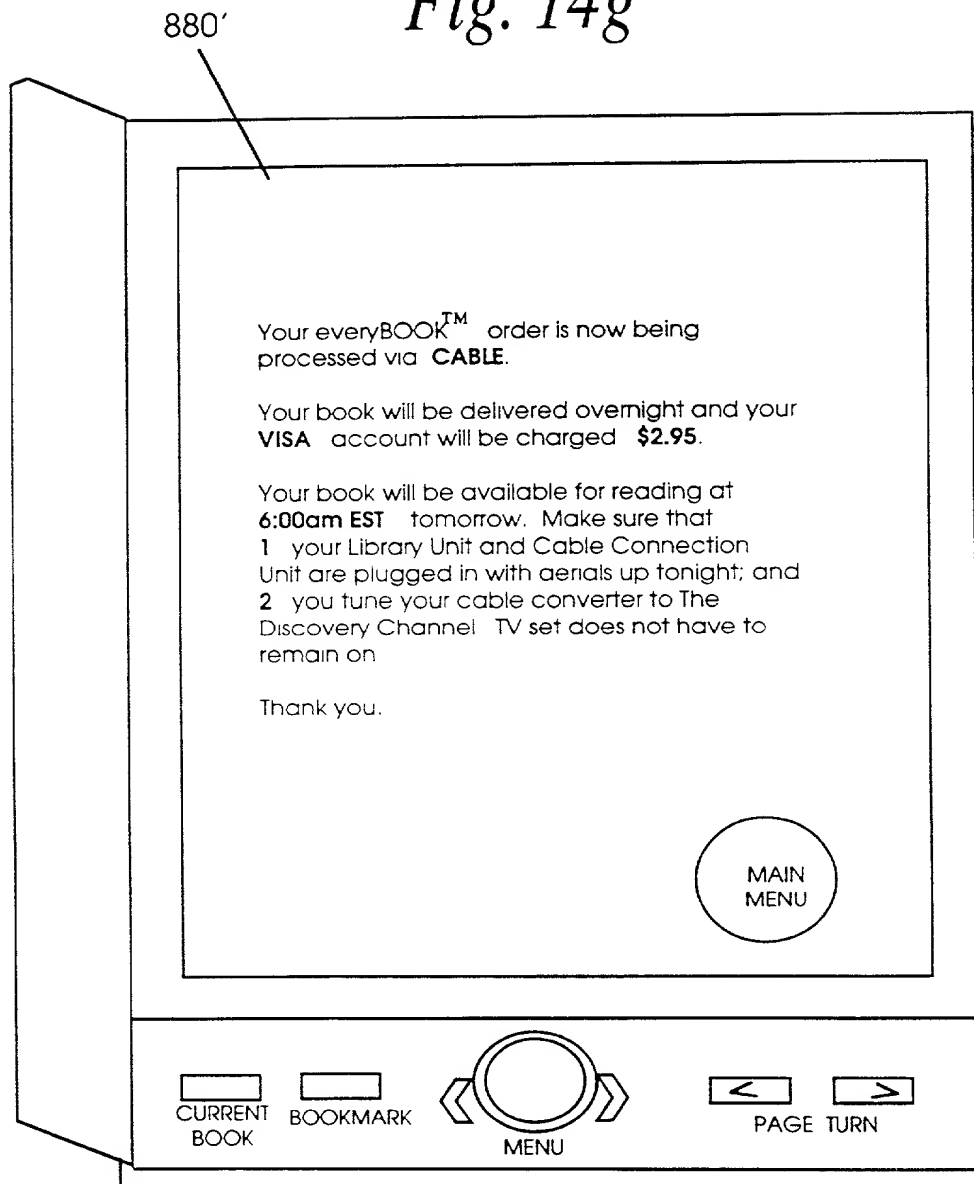


Fig. 14g



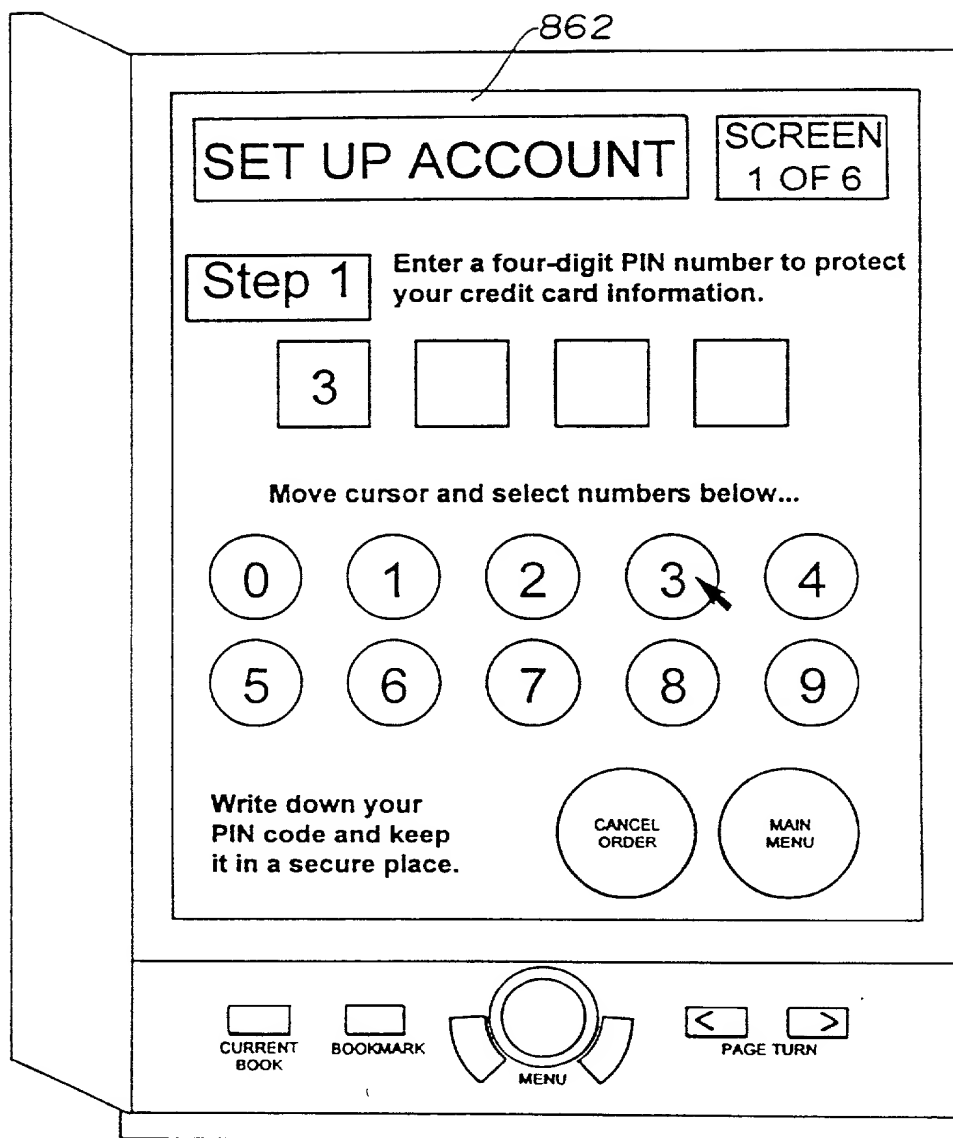


Fig. 14i

864

SET UP ACCOUNT

SCREEN
2 OF 6

Step 2

Select a credit card you wish to use for your everyBOOK™ purchase.

VISA

American Express

Discover

Step 3

Enter your credit card number and expiration date using keypad below.

exp. MM YY

Step 4

Enter your home phone number using the keypad below.

area code

0

1

2

3

4

5

6

7

8

9

ERASE & TRY AGAIN

CONFIRM & CONTINUE

CURRENT BOOK

BOOKMARK

MENU

<

>

PAGE TURN

Fig. 14j

864'

SET UP ACCOUNT

SCREEN
3 OF 6

Aren't you glad you only have to do this once?

STEP 5

Enter your name as it appears on your credit card

A	B	C	D	E	F
G	H	I	J	K	L
M	N	O	P	Q	R
S	T	U	V	W	X
Y	Z	.	-	space	

ERASE
& TRY
AGAIN

CONFIRM
&
CONTINUE

CURRENT
BOOK

BOOKMARK

⬅

○

➡

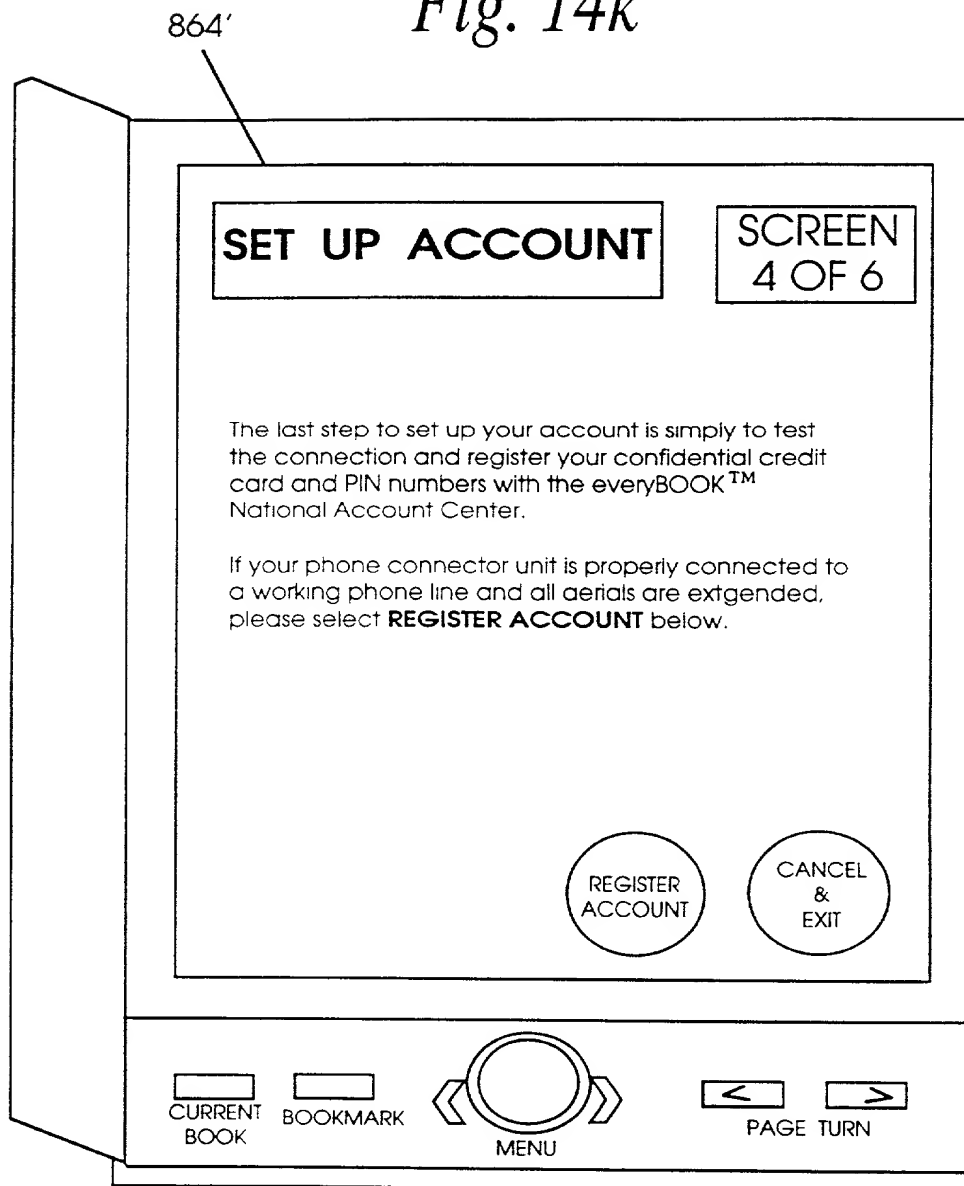
MENU

⬅

➡

PAGE TURN

Fig. 14k



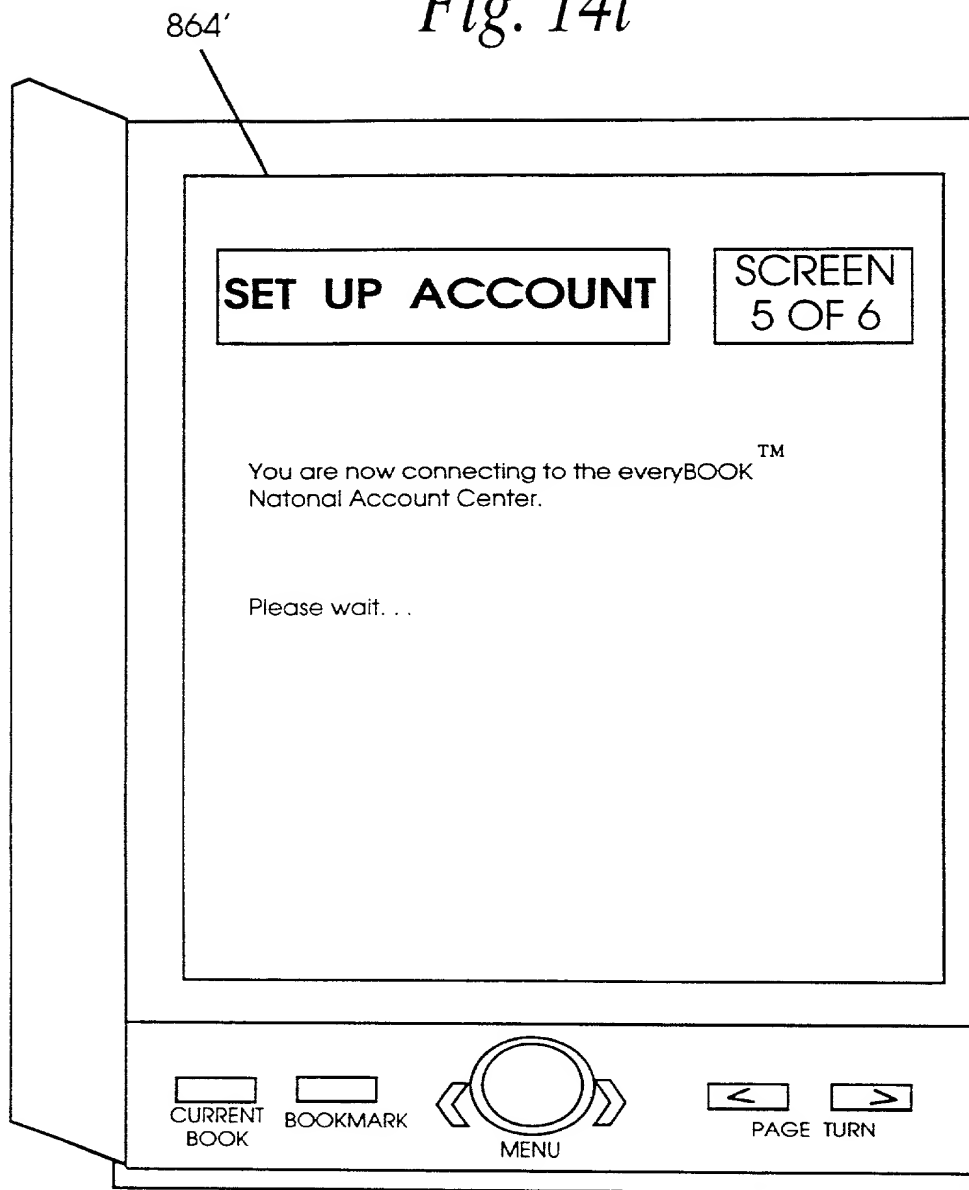


Fig. 14m

864'

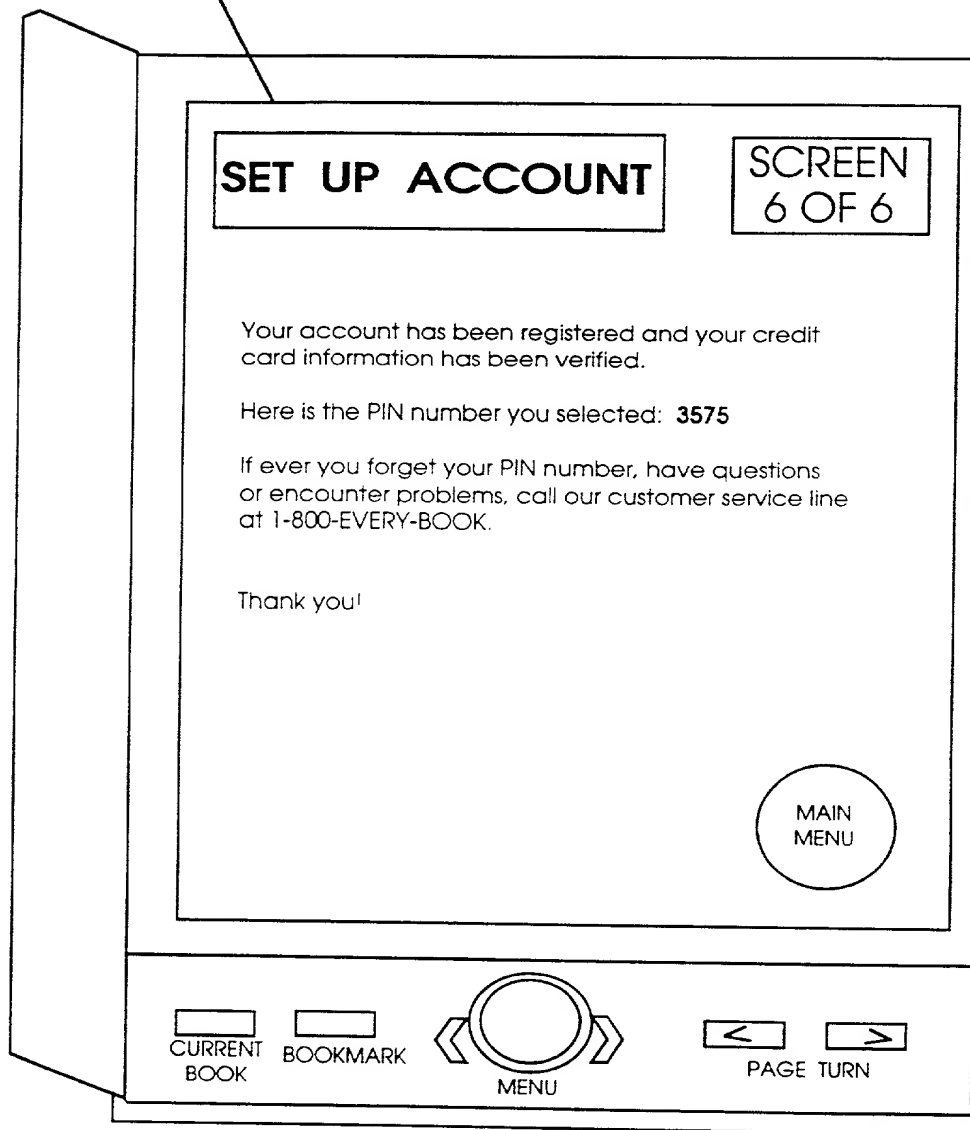


Fig. 14n

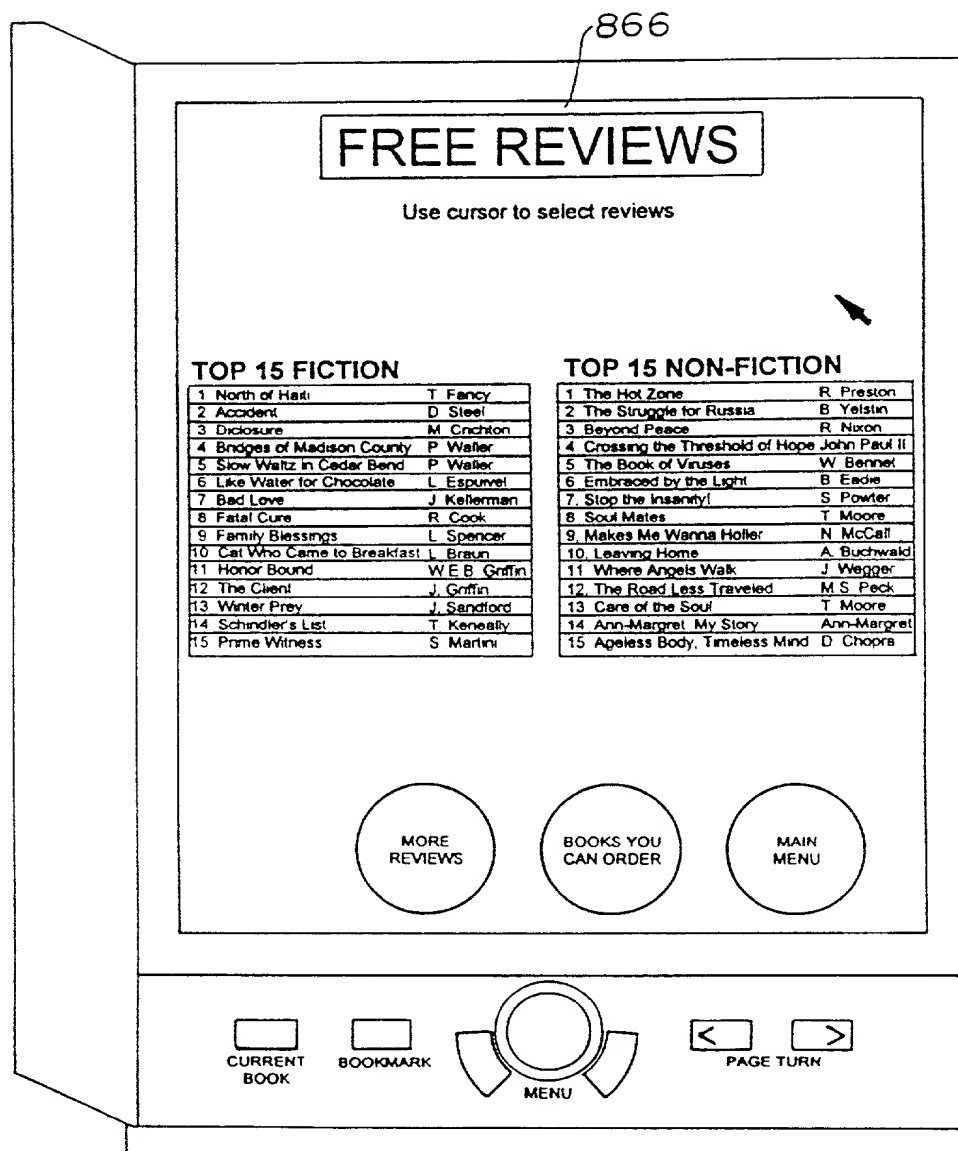


Fig. 14p

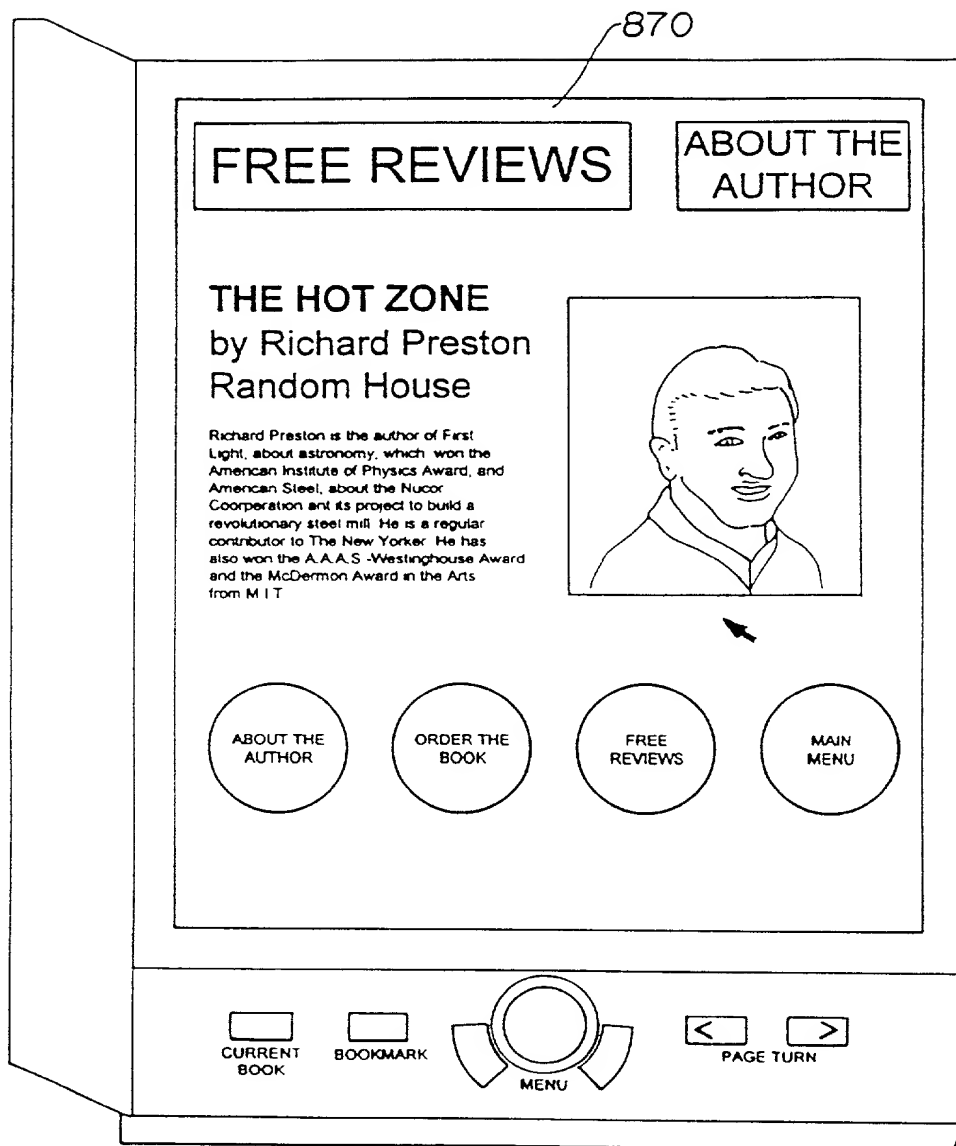


Fig. 14q

894

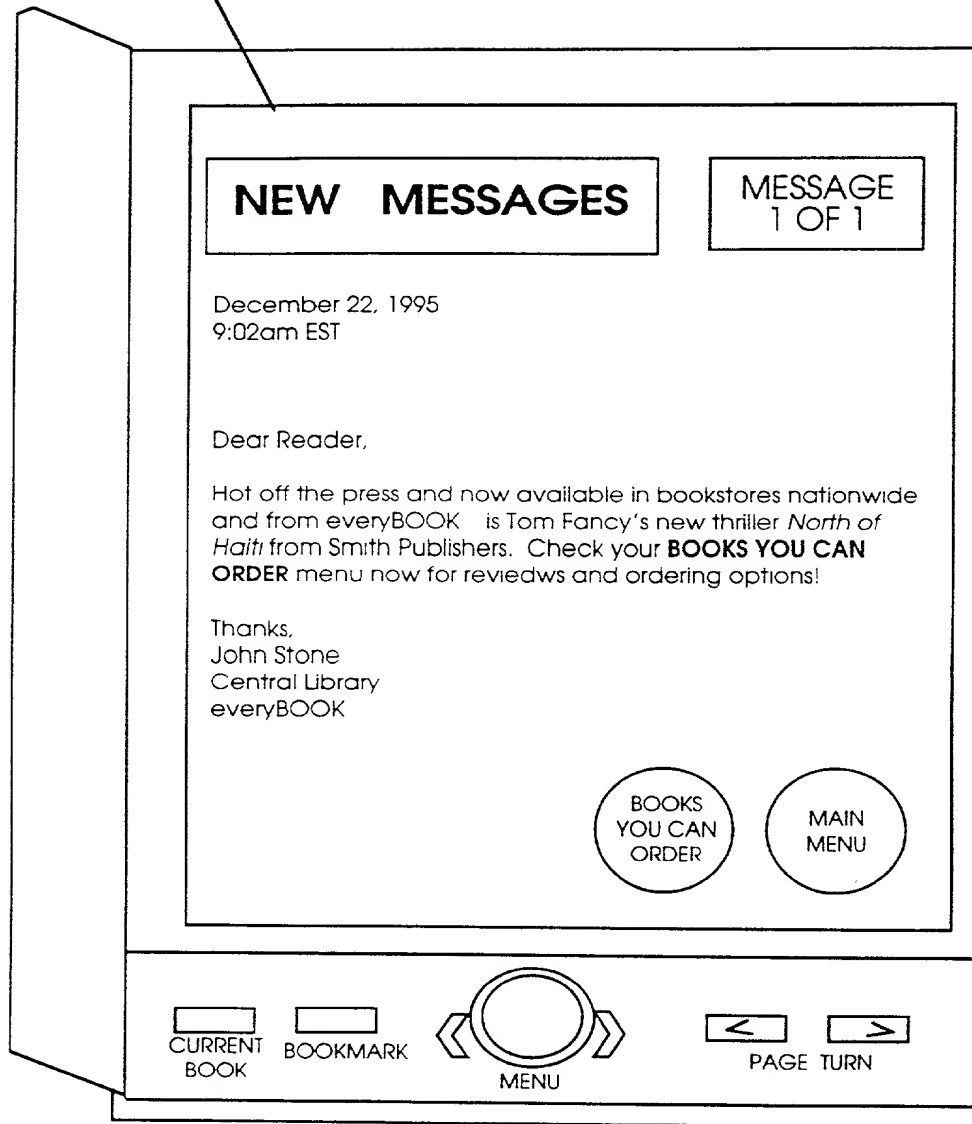


Fig. 14r

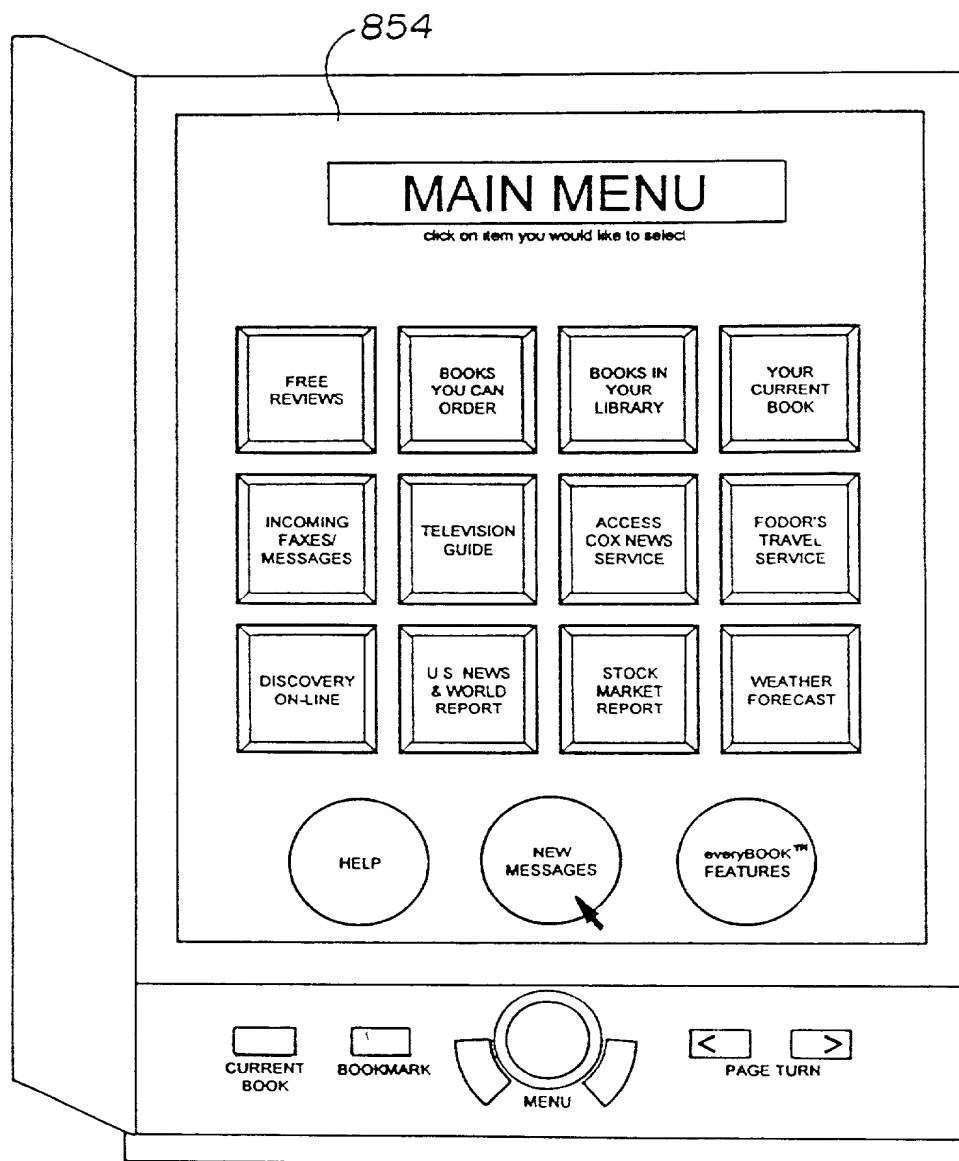


Fig. 14s

851

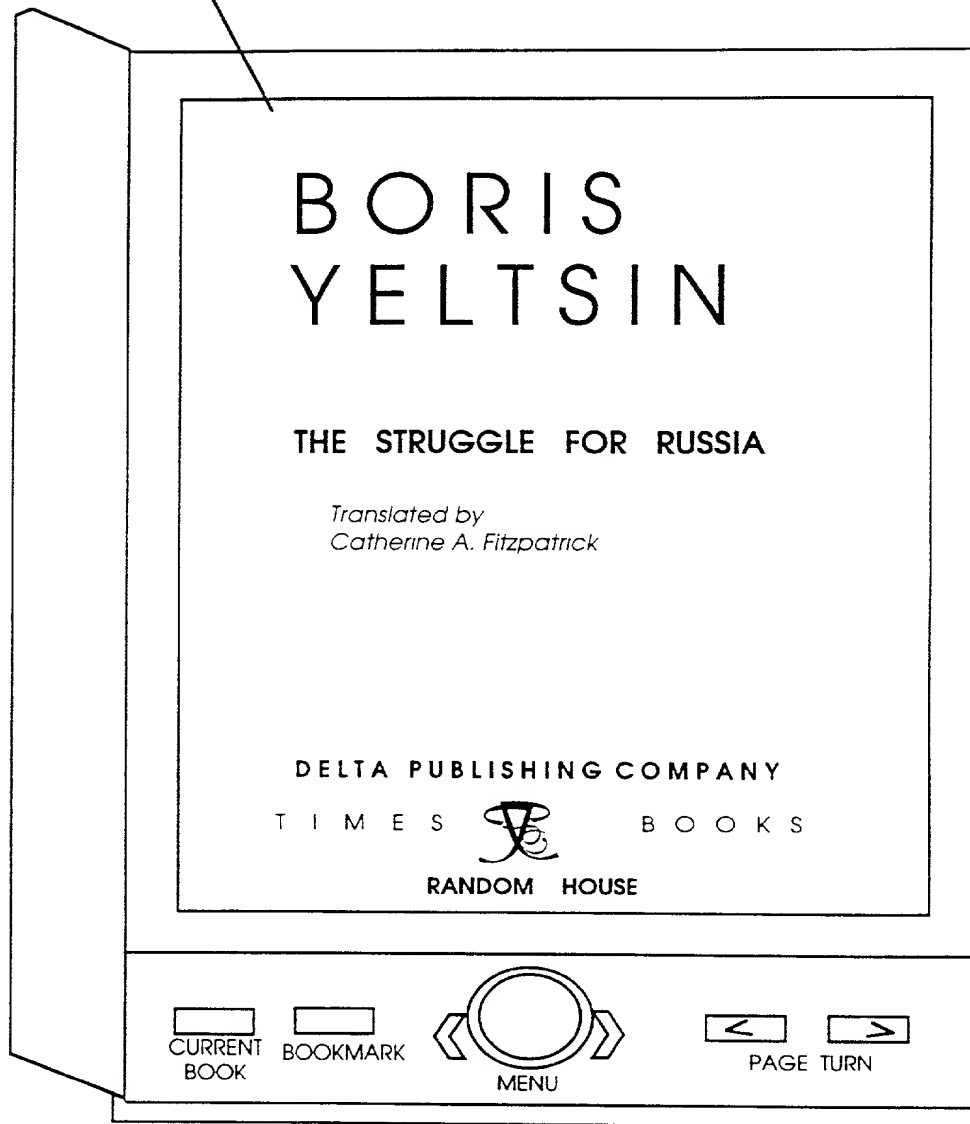


Fig. 14t

853

ical demands: the resignation of Gorbachev. To be sure, as part of Ukraine, Donbas was now on Leonid Kravchuk's conscience. Vorkuta and Kuzbas were coal-mining areas I had visited a number of times and to which I would certainly return. Their demands were harshly formulated at times, and they expected a great deal from me, but they supported me during the tough reforms.

We have a saying in Russia that when you chop wood, the chips fly. Although Khasbulatov tried his best to portray the miners as economic chips flying from the Gaidar team's woodcutting, their demands did not fit the picture. These miners were not against reform. Nevertheless, they did try to defend their economic interests, insisting that such hard work should be rewarded with part of the overall profits from the industry. Unfortunately, we did not have precise mechanisms to turn such enterprises as coal mines into joint stock companies. There were long, hard negotiations under way constantly.

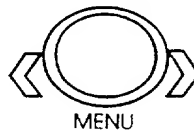
I must say that in the spring and summer of 1992, when the word *stoppage* resounded throughout the country (the work stoppage on trains with coal, the stoppage on factory floors, the stoppage of transportation), may aid Yuri Skokov very courageously conducted the negotiations with the miners.

I met Yuri Skokov when I worked at the Moscow City Executive Committee. He was director of Quantum, a large defense plant, and he had run for elections to the Soviet parliament against Vitaly Korotich, a prominent writer and journalist who at the time was editor in chief of *Ogonyok* (*Little Flame*), a pioneer of glasnost. Due to various backroom deals and party scheming (described in *Against the Grain*), Skokov won the election and proved himself to be a disciplined party protege.

Skokov is an intelligent man—that is the first thing that must be said about him. And very hard and taciturn. Many people were asking what his role was in my inner circle. It was a legitimate question. Skokov was actually the "shadow" prime minister whom I had always had in mind. Both Slayev, under whom Skokov chaired the Supreme Economic Counsel*, and Gaidar, on whose watch Skokov became chairman of the Security Council, sensed a latent threat.

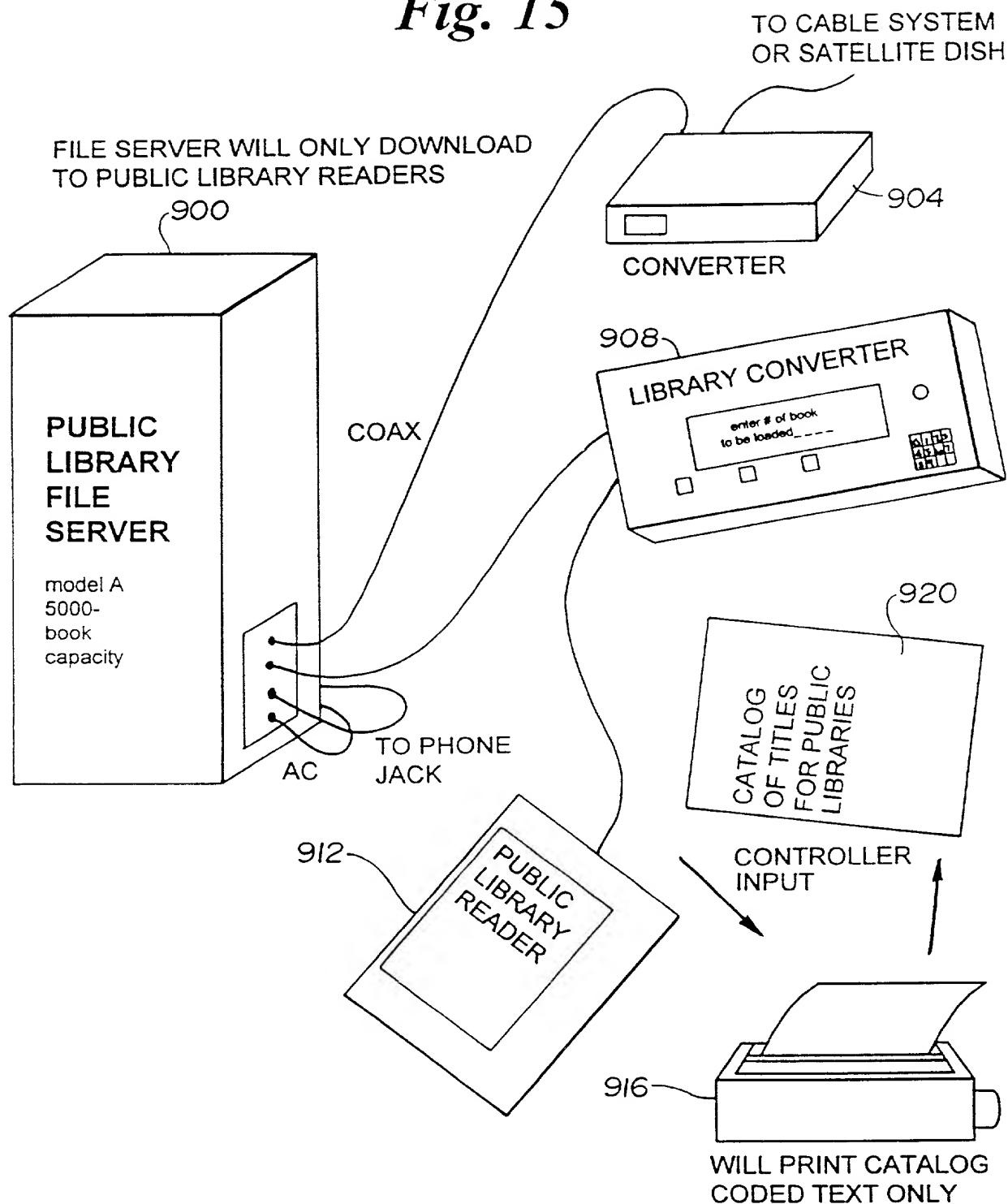
CURRENT
BOOK

BOOKMARK



PAGE TURN

Fig. 15



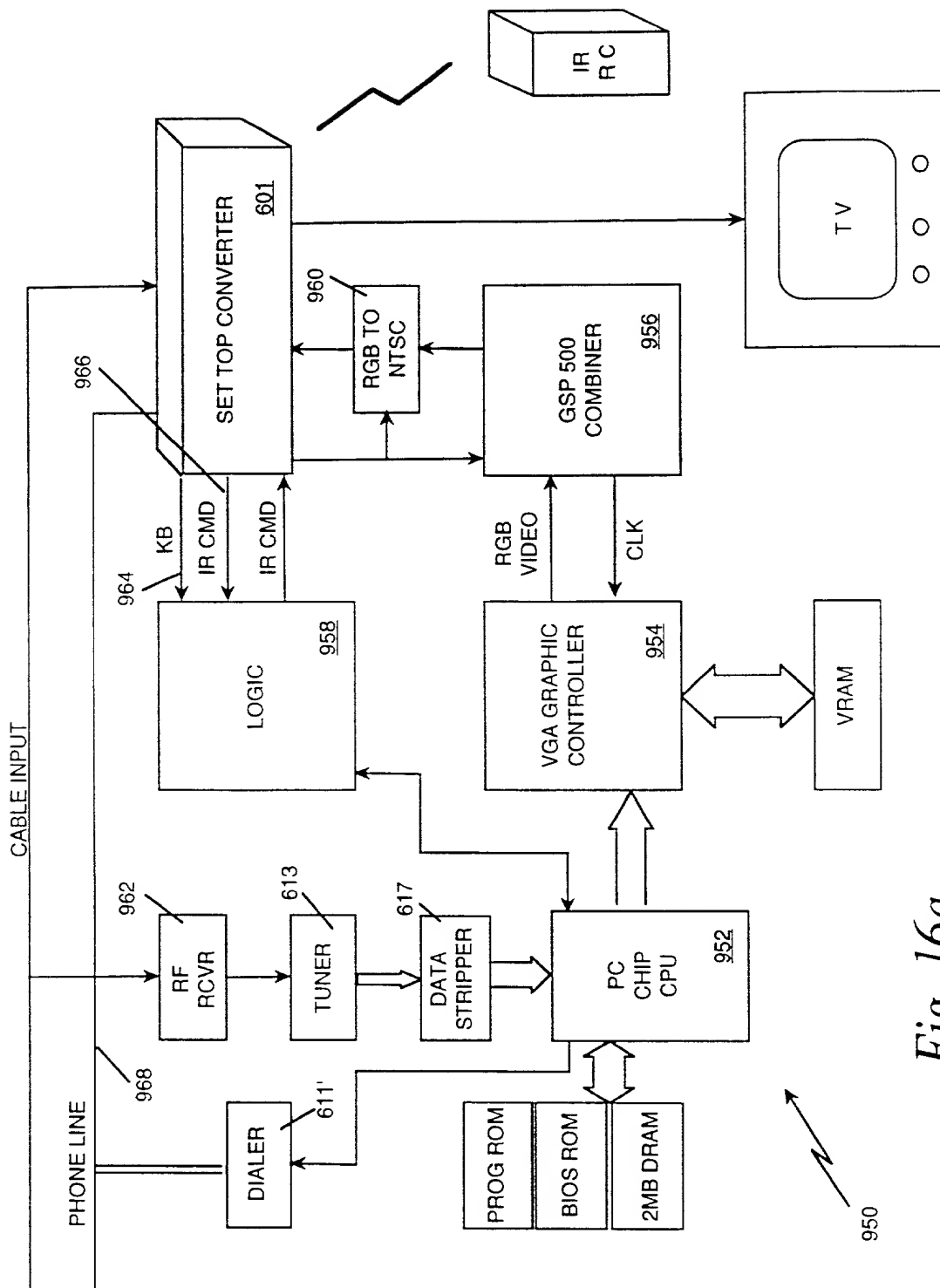


Fig. 16a

950

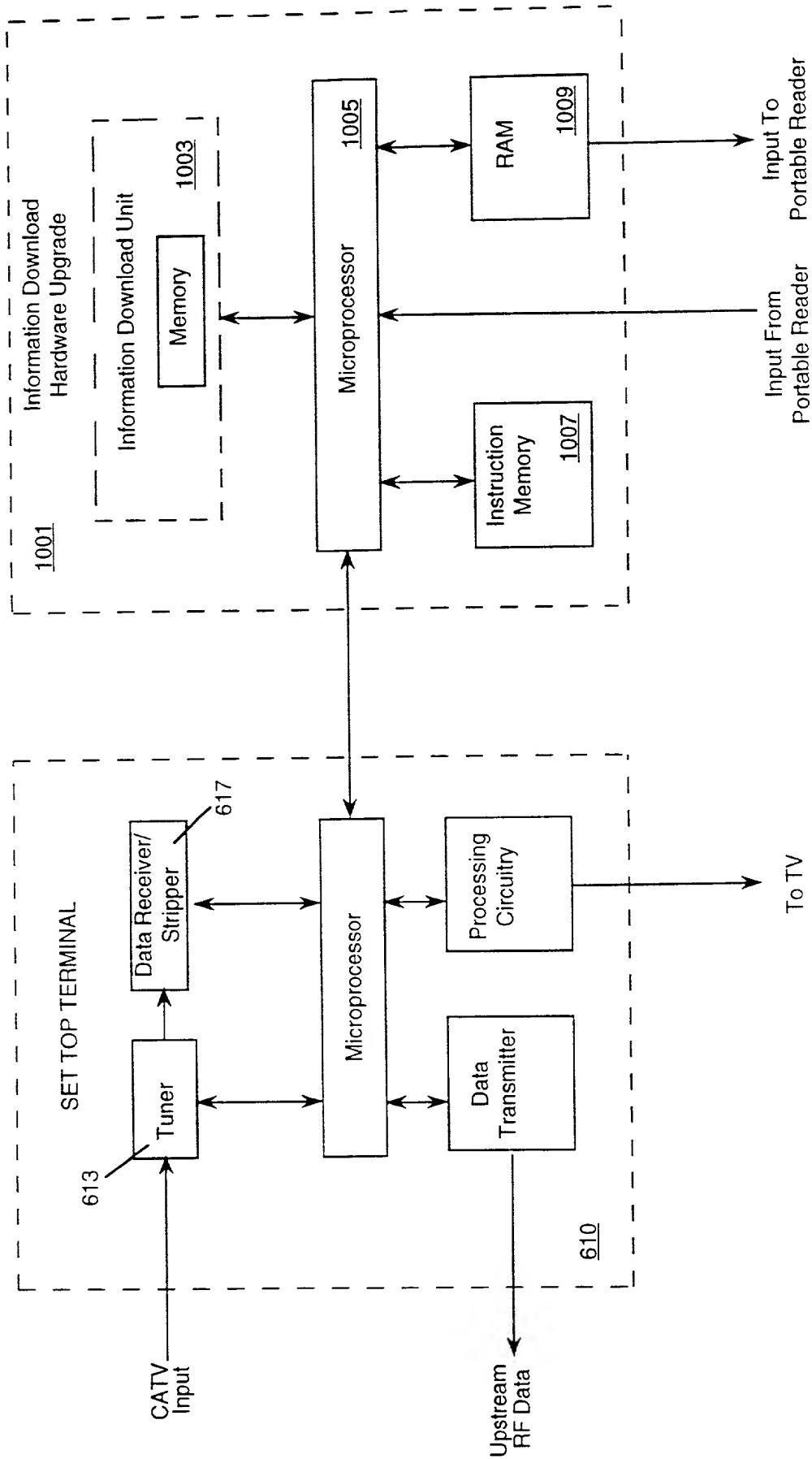


Fig. 16b

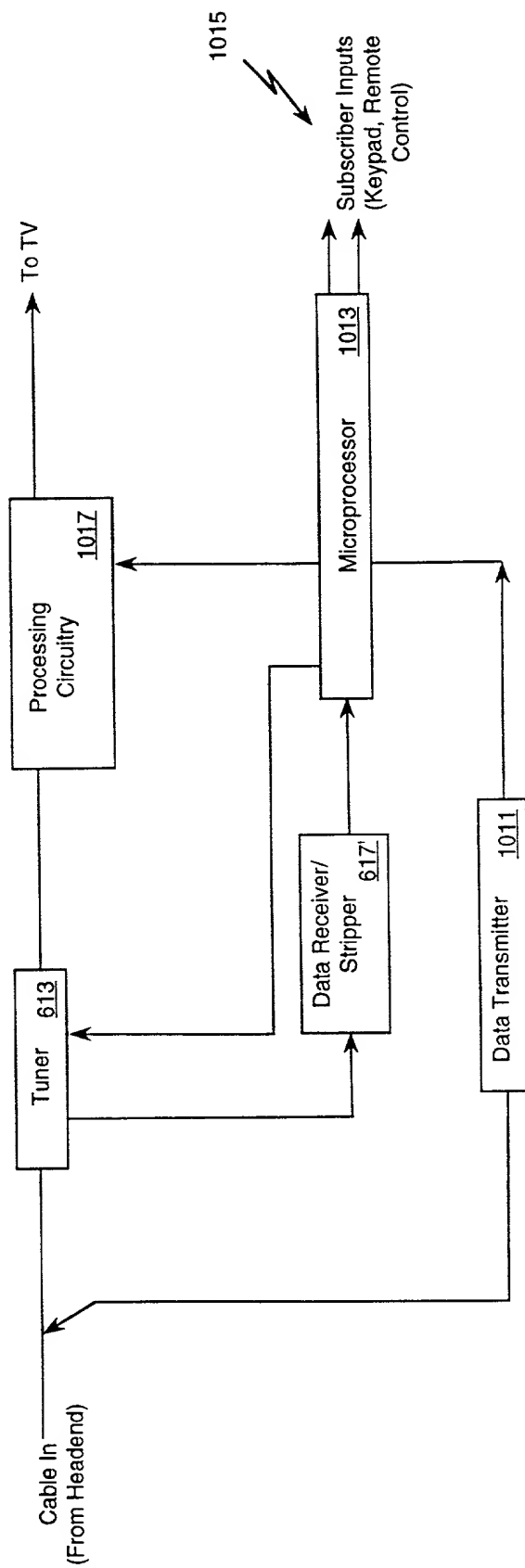
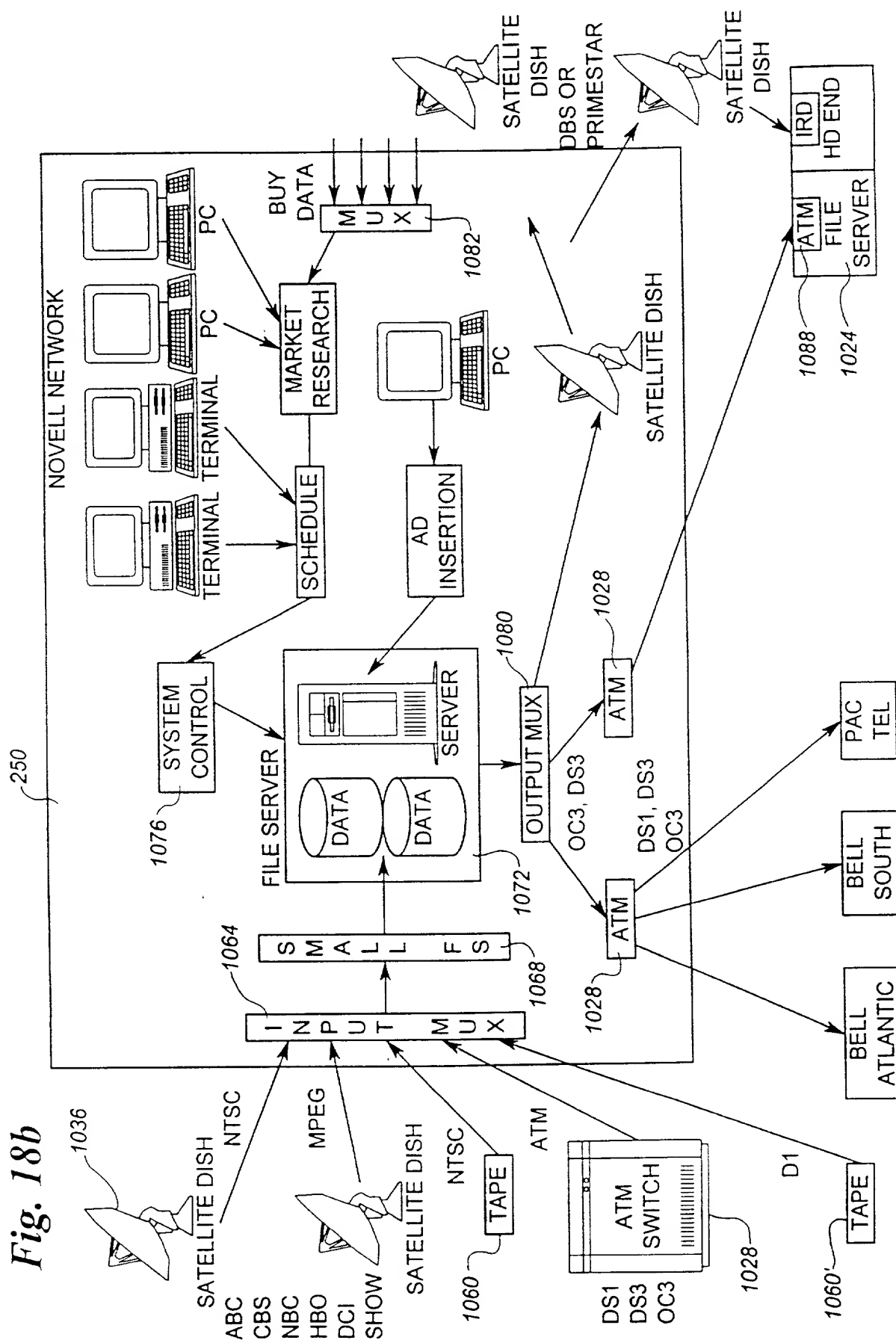


Fig. 17

Fig. 18b



DECLARATION FOR PATENT APPLICATION

As below named inventor, I hereby declare that:

My residence, post office address and citizenship is as stated below next to my name.

I believe I am the original, first and sole inventor of the subject matter which is claimed and for which a utility patent is sought on the invention entitled ELECTRONIC BOOK SELECTION AND DELIVERY SYSTEM, the specification of which was filed on November 7, 1994, as Application Serial No. 08/336,247, and which is a continuation-in-part application under 35 U.S.C. §120 of U.S. Application Serial No. 08/160,194, entitled ADVANCED SET-TOP TERMINAL FOR CABLE TELEVISION DELIVERY SYSTEMS filed December 2, 1993, which is a continuation-in-part application under 35 U.S.C. § 120 of U.S. Application Serial No. 07/991,074, entitled TELEVISION PROGRAM PACKAGING AND DELIVERY SYSTEM WITH MENU DRIVEN SUBSCRIBER ACCESS, filed December 9, 1992.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims.

I acknowledge the duty to disclose to the U.S. Patent and Trademark Office information known to be material to patentability in accordance with Title 37, Code of Federal Regulations, Section 1.56(a).

I acknowledge the duty to disclose to the U.S. Patent and Trademark Office all information known to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56, which became available between the filing date of prior applications U.S. Serial No. 08/160,194, entitled ADVANCED SET-TOP TERMINAL FOR CABLE TELEVISION DELIVERY SYSTEMS, filed December 2, 1993, and U.S. Serial No. 07/991,074, entitled TELEVISION PROGRAM PACKAGING AND DELIVERY SYSTEM WITH MENU DRIVEN SUBSCRIBER ACCESS, filed December 9, 1992, and the national filing date of this continuation-in-part application.

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the U.S. Patent and Trademark Office connected therewith: Eugene L. Johnson (Reg. No. 21,028), David N. Fronek (Reg. No. 25,678), Stuart R. Hemphill (Reg. No. 28,084), Jon F. Tuttle (Reg. No. 25,713), Aldo Noto (Reg. No. 35,628), Allan M. Soobert (Reg. No. 36,284), John E. Giust (Reg. No. 38,064), and Scott W. Doyle (Reg. No. P-39,176).

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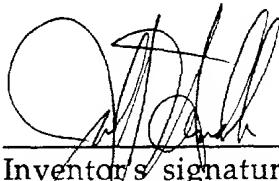
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I hereby declare that all statements made herein of my own knowledge
are true and that all statements made on information and belief are believed to be
true; and further that these statements were made with the knowledge that willful
false statements and the like so made are punishable by fine or imprisonment, or
both, under Section 1001 of Title 18 of the United States Code and that such willful
false statements may jeopardize the validity of the application or any patent issued
thereon.

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Full name of sole or first inventor


Inventor's signature

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